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WE

EDITORIAL

THERE is to be no Nobel peace prize this year. Too bad. Have they forgotten Marshal Foch and Admiral Beatty?

AGAIN it has been suggested that the Chicago river be straightened, but no one yet has talked about washing it.

EVERYBODY expected the German navy to come out—not at the end of a string however. Thus passes the toast to *Der Tag*, and with it, the navy that lost its soul.

THE first reinforced concrete ship to be completed for the Emergency Fleet Corporation was launched at the yard of the Liberty Shipbuilding Company on December 3. She was named 'Atlantus'; her carrying capacity is 3500 tons.

WAR-TIME restrictions on exports are far from having been removed. The list, published by the War Trade Board on December 6, shows some 1200 commodities upon which the ban still rests, while a supplemental list issued December 16 removed only 100 of these. Business as usual has not yet arrived.

EVERYBODY seems terribly exercised as to the ultimate disposition of the surrendered German ships. Each of the Allied nations seems to want to put them in its own stocking for Christmas, especially the smaller countries, to whom a nice, cheap, ready-made navy seems to appeal. Why not turn them over to the scrap committee of the Pacific Coast foundries?

OPEN markets are now the rule for iron and steel, and the same is true for other base metals, with the exception of tin. Control of this metal will be continued until the stocks allocated to the United States Steel Products Company, the distributor for this country under the world pool, have been liquidated. Some reduction appears probable in the prices of all the formerly controlled metals. The reductions proposed by the iron and steel producers themselves range from $3 per ton on pig-iron to $8 per ton on shapes.

SELECTIVE service has proved its value. The old volunteer system had many attractive features; in fact, it was all right but for one defect. It would not work. Irrespective of the difficulty of raising the large army needed, the expert machinist was likely to volunteer while the pool-room 'shark', who might, after a rigid course of training, develop into a good soldier, stayed behind. The former needed restraint, the latter encouragement, even if it took the form of a swift kick into the Army. Both these requirements the Selective Service Act provided. Whatever our future military policy may be, we will never go back to the volunteer system.

COUNT MAX MONTGELAS says that Germany expects impartial justice from the United States. Most of us feel just that way about it, but, as the Allies are Christian nations, what Germany will probably get will not be justice, but mercy. Impartial justice would involve the destruction of a large part of their country, and the execution of an equally large part of their population. The country will have to be preserved for three reasons, to pay indemnities, to live in shame and suffer, and finally, we hope, to form a new Germany with a consideration for humanity instead of Kultur, a nation with which the rest of the world may live in peace and amity.

WAR BOARDS of various and assorted kinds seem to be dissolving rapidly under the sun of peace. The dollar-a-year men are returning to real salaries, and the greatest general of them all, General Public, has resumed possession of the bag, which he will hold with his accustomed fortitude. Only six billions are to be raised by taxation for the year 1918, which paltry sum the American people will pay gladly. Mr. McAdoo has resigned, and will recuperate in California, which proves him to be a man of fine discrimination and excellent judgment. Peace is here and there has been neither panic nor upset in business conditions, all of which goes to show that the United States is sound to the core, and that anybody who is a bear on American business is bound to go broke.

PATRIOTIC zeal caused a number of good business men to neglect business precaution in their dealings with the Government, to their sorrow. Closing contracts with Government officials by telephone, and neglecting to secure the customary confirmation in writing, is having its reaction in the form of many cancellations which mean large losses to the contractors. Most of the contractors took the word of those with whom they were dealing in good faith, and they should not be made to suffer pecuniary loss by reason of this faith. Red tape that the spirit of the conduct of the War caused to be severed seems to have been re-tied for the purpose of avoiding what seems, on the face of it, to be at least a moral obligation. The fact that the United States cannot legally be sued does not impair this obligation in the least. A reasonable adjustment of this kind of contract, based upon investigation of the merits of individual cases, is no more than fair and just.

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Happy New Year!

Happy New Year! The good old-fashioned greeting for this season comes from the heart as never before within the memory of this generation. Thrice blessed are the American people. They have met a great emergency, a great crisis. They have made good. Their sacrifices have been small compared to the end achieved. The drain on their wealth, great though it has been, has little more than scratched the surface of their vast resources. The world is united in paying honor to the President of the United States, who, on foreign soil, has reviewed the greatest fighting force this country has ever produced. The principles upon which the peace treaty will be framed are those enunciated by the chief magistrate of the United States. What would Washington, Jefferson, and Hamilton say if they knew what a mighty nation had evolved from those struggling thirteen colonies for which they fought and bled? What would Lincoln say if he knew that the inspiration of a government by the people, of the people, for the people was the lodestone that is drawing the peoples of Europe from the threat of Bolshevism and anarchy? Upon the American people has come a vast responsibility, the position of the great moral force of the world. This responsibility has come unsought, and its assumption involves in turn a further responsibility of the people to one another. Let us hope that in the year to come, and in the other years to follow, that never will class be pitted against class, that attempts on the part of interested individuals will never drive a wedge between employee and employer, that intolerance of one by the other will be succeeded by an appreciation of the value of co-operation for the common good. Co-operation means first, sacrifice, the concession to the other fellow of that which you would like to keep for yourself. It is the antithesis of selfishness, and selfishness, like the love of money, is one of the roots of all evil. Put yourself in the other fellow's shoes, consider everything from his angle, and every new year will be a happy one.

Continue the Food Administration

Under the present law, the United States Food Administration must cease its activities as soon as the treaty of peace is ratified, although the world shortage of food will continue for at least a year or so longer. Is this common sense? It is probably true that some of its powers could not be exercised constitutionally in time of peace, and there is, of course, no time for the necessary constitutional amendment, even if one were desirable, but is that any reason for throwing the whole organization overboard? The United States has promised to ship 17,500,000 tons of food during the coming season to England, France, Italy, and Belgium alone, not counting the other nations. This is considerably more than we sent to all Europe last year, even under the stimulus of the 'Food Will Win the War' slogan. This shipment must be made, but it cannot be done without at least some guidance. The Food Administration's activities have been three-fold; to stimulate production, to regulate distribution, and to decrease waste in every way, particularly in consumption. Prices will probably continue to be high enough to bring production to the maximum. The people as a whole have succeeded so well in curbing waste by voluntary measures that we may expect reasonably good results to continue. Nevertheless, some official or semi-official body, even though it may have no actual authority, is needed to guide production, distribution, and consumption. It will be simpler and better in every way to continue the Food Administration organization to handle this work than to create any new organization.

Freedom of the Seas

Before we get too excited talking about the freedom of the seas and the British fleet, suppose we stop a minute and look at the question from the British viewpoint, or perhaps even that viewpoint is unnecessary. Maybe the viewpoint of any man of ordinary common sense will do. In the first place, where would we all be now if there had been no British fleet during the past four and a half years? Christmas cheer might be plentiful in Berlin and Vienna, but there would be little or none in New York and San Francisco. 'Freedom of the Seas' is a fine-sounding term, but the little freedom that the seas have ever known has been mainly due to that same British fleet. We do not mean that it has always been used on the side of Liberty. It has not. But the freedom and safety, for instance, that German vessels had before the War to go to any port in the world, was mainly because Great Britain had continued the fight against piracy so ably started by our own Decatur. We need and must have the League of Nations, but it will be a new and untried machine. Would it not be just as well to have an auxiliary plant to take the load in case of a temporary breakdown until repairs could be made?

Minimum Wages

Various Government officials and others have rushed into print recently regarding the minimum wage that ought to be paid throughout the country. There appears to be a peculiar sacredness about $5.80 per day, although the cost of living probably varies at least 50% in different localities, and woe to the man who touches a hair or a penny of yon amount. Firms that are not able to pay it apparently may go out of business, although nothing is said about what arrangements should be made to take their place. What the minimum-wage advocates really mean, if they mean anything, is probably that every wage-earner should receive enough to permit him to purchase daily a certain amount and number of commodities, the average cost of which for the entire country is $5.80. This end is certainly much to be desired. Five dollars and eighty cents is not very

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much in these days, although many employers and professional men would be glad to be assured of clearing that amount every day. But suppose that our efficiency of production and distribution should prove to be too low to provide the aforesaid list of commodities for every worker? The mere fixing of a minimum wage would be useless in such a case. Would it not be better to concentrate efforts on increasing efficiency of production and distribution, and see if not only that quantity of commodities but even a larger amount could not be made available for every worker?

The Mooney Fiasco

It is unfortunate that some of the activities of the Department of Labor on the Pacific Coast, while probably based on good intentions, have not been such as inspire confidence. There is a doubt in the minds of many fair-minded people as to Mooney's guilt or innocence of the crime with which he is charged. Many more people believe that he has not had the fair trial to which even a guilty man is entitled. Adroit use of these doubts on the part of the lawyers for the defense has caused the case to become actually, as they claim, a matter of national and even international importance, and as such a proper subject for Federal investigation. But why in the name of all that's foolish was such an investigation entrusted to the Department of Labor rather than the Department of Justice? Following his unannounced appointment the agent of the Department of Labor proceeds to show his incapacity for such an investigation by compiling a report by questionable methods, giving a copy to a sensational daily newspaper, and then hurrying from the State a few hours in advance of a subpoena. After a month of delay and of strenuous efforts on the part of the Grand Jury and the State authorities, an official statement comes from the Department of Labor that the giving of the report to the aforesaid newspaper had not been authorized or intended by the Department, but that Mr. Densmore cannot be spared long enough from Department activities to testify before the Grand Jury. We wonder what kind of work the Department is entrusting to a man that it admits is entirely lacking in discretion, and whether he will make as much of a 'botch' of that as he did of his investigation in San Francisco. Meanwhile, no one is really satisfied with the present disposal of the case, and there is no prospect of a better solution being reached.

Labor Surplus or Shortage?

It is easy to take the number of men in our Army and Navy, add to that the number of workers in munition factories, and draw all sorts of alarming conclusions about unemployment and hard times. However, the men in the Army and Navy are not all going back to private life. Whether as an exclusively National force, or as a contribution to the forces of the League of Nations, we will have several hundred thousand men under arms for many years to come. Again, as has often been pointed out, the transportation and demobilization of the remaining troops will be a matter of months, probably of years. Of the munition workers, many of the women will leave industrial lines altogether. Many of the boys will go back to school; a lot of them certainly had a great deal to learn. Of the men workers, the good ones, as always, will have no trouble in getting a job in some peace activity, usually at just as good or better wages than they have been getting. The 'machinists' that have been making a specialty of tightening $\frac{5}{8}$-inch bolts may have to accept lower wages, but they will usually be able to find some job producing either raw materials or the many manufactured articles of which the world's stock has run low. Another factor in the problem is frequently overlooked. During the two years immediately preceding the War, more adult immigrants came from Europe to the United States and Canada than there have been soldiers sent from the United States and Canada during the War. In spite of business conditions that were far from the best, nearly all of these immigrants found work. Immigration there will be after the War, but it will probably be almost if not entirely balanced by emigration. In view of these facts, there is every reason to believe that our industries, under the stimulus of the demand already being felt for all sorts of peace requirements, will be able to absorb all the available labor. Local and temporary unemployment there will undoubtedly be, but the all-round calamity howler is drawing on his imagination. And, as a corollary, the manufacturer that refrains from buying labor-saving machinery because he figures that labor will soon be plentiful and cheap, is going to be badly fooled.

Oil Engines for Marine Propulsion

The arrival seven years ago of the first Diesel-engined ship at San Francisco aroused great interest on the part of marine engineers and shipping men. A saving of one-half to three-fourths of the fuel is alone an important consideration. When to this is added the elimination of boiler-space and boiler troubles of all kinds, and the increase of cargo space resulting from both these factors, the layman is inclined to wonder why the heavy-oil engine has not been adopted universally. That this question has occurred to others than laymen is evidenced by the fact that the San Francisco Section of the American Society of Mechanical Engineers devoted an evening recently to its discussion. The program comprised papers by J. H. Hanson, of the Skandia-Pacific company, George A. Dow, of the Dow company, and Bruce Lloyd, of the Emergency Fleet Corporation. Mr. Hanson's paper dealt mainly with the semi-Diesel engine, and Mr. Dow's with the Diesel engine. Both were illustrated with slides showing heavy-oil engines and the vessels in which they are being used. Mr. Lloyd showed that it was not surprising that designers of

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steam-propelled vessels were still a little doubtful of the reliability of internal-combustion engines, since it is only in the past twenty or thirty years that naval architects have had sufficient confidence in steam-engines to design steamers without sail-masts. Non-stop runs of many thousand miles are becoming the regular rule with Diesel and semi-Diesel vessels. Owners and designers of vessels have hesitated to specify heavy-oil engines in the past because of the difficulty of obtaining trained crews and also because of trouble in repairing such engines in out-of-the-way ports. These problems are being solved as this type of engine becomes better known throughout the world. One of the salient points in Mr. Lloyd's paper was the statement that, for long runs, a 3500-ton Diesel ship had almost as much actual cargo capacity as a 5000-ton oil-burning steamer. All the speakers agreed that the high class of workmanship particularly necessary for the successful production of the heavy-oil engine could be, and was being, obtained in the San Francisco Bay district, and that the engines produced were not excelled by any other plants.

Retro-Active Wage Scales

What a discouraging thing these retro-active wage-awards are! The factory-owner cleans up a contract and proceeds to forget it, only to be jacked up with a round turn by a mandate to go back over a period of months and give all hands and the cook an additional wage. This extra expense cannot be passed on to the consumer, except, we understand, among those who have contracted directly with the Government. Those to whom details of Government work have been sub-let are without redress. The whole system is fast becoming intolerable. The labor unions are demanding more and more. Their appetite is insatiable. In consequence, up and up go the prices of everything in which let not the cost of living be forgotten. The scales tip first one way and then the other. A balance is never attained. It is enough to give the goose that laid the golden eggs the pip. This sort of thing can go on just so long before a break. Mr. Gompers paid his respects to the 'Bourbons', whoever they may be, when it was hinted that a return to the pre-war wage and time scales would be a fine idea. Every one of us wants a square deal, a chance to earn a decent living, and a reasonable work-period. Short of Paradise, that is about all we may expect. We can see little difference in masters, whether they be capitalistic or laborite. The two essential elements of industry, which ought to be partners, are continually at swords' points, while the industrial conditions prevailing in Europe will offer such strong competition that we are in great danger of being excluded altogether from foreign markets. Where is a leader who can offer some practical scheme that will do away with this continual bickering and ill-feeling that presents the greatest menace imaginable to the future happiness and well-being of the American people?

A New Source of Capital

One of the most important results of the War has been the tremendous increase in the number of security-holders in the United States. All told, it is probable that 30,000,000 people have bought Liberty Bonds. There has been considerable trading in these securities, a great deal too much in fact, but any great reduction in the number of bondholders is not probable. Estimates of the number of security-holders in all enterprises before the War vary, but it is not likely that the number exceeded 1,000,000. Long before the last installment on the last Liberty Bond is paid, there will be a large number of men and women that have been accustomed to save a certain amount each month, and who have learned, not how easy it is to save, because it is not and never will be, but that saving is a possibility. Another feature of the problem is the fact that the country is going dry, and opportunities for gambling, as well, are becoming woefully restricted. Whatever our personal opinion may be regarding the wisdom of these changes, the fact remains that a part of the money formerly diverted toward these channels is going to be saved. The legitimate industries of the country, including the metal trades, should not allow the 'fly-by-night' promoter to 'beat them to it' in developing these new and important sources of capital. One of the most annoying things in life is to have a growing business and no way to raise the necessary additional capital to take care of it. 'Baby bonds' and stocks, sold on easy payments, should prove the salvation of many a struggling industrial enterprise.

Americanization

The War has brought with it a realization of the fact that, while the majority of our immigrants from the days of Jamestown and Plymouth have become good citizens, some of them, on the other hand, have fallen a long way short of American ideals. Part of this has been the immigrant's fault and part of it our own. If the immigrant was disposed to regard the United States merely as a place in which to make money, and failing that, to create disorder, the American, on the other hand, was apt to exploit the immigrant and his labor and then pay no further attention to him. The Bolsheviki are fools or knaves, or both, but we must not forget that most of the leaders went to Russia direct from the East Side of New York. Perhaps, if conditions in the latter locality had been a little more really civilized, they might have discovered that democracy is better than anarchy. We shall not miss the Bolsheviki that have gone from this country, but the immigrants remaining here that have not yet come to an appreciation of American ideas and ideals constitute at once a source of danger and a reminder of a neglected duty. Let us treat the immigrants, both employees and others, like men, and encourage and help them to learn English and to become American citizens in the best sense of the word.

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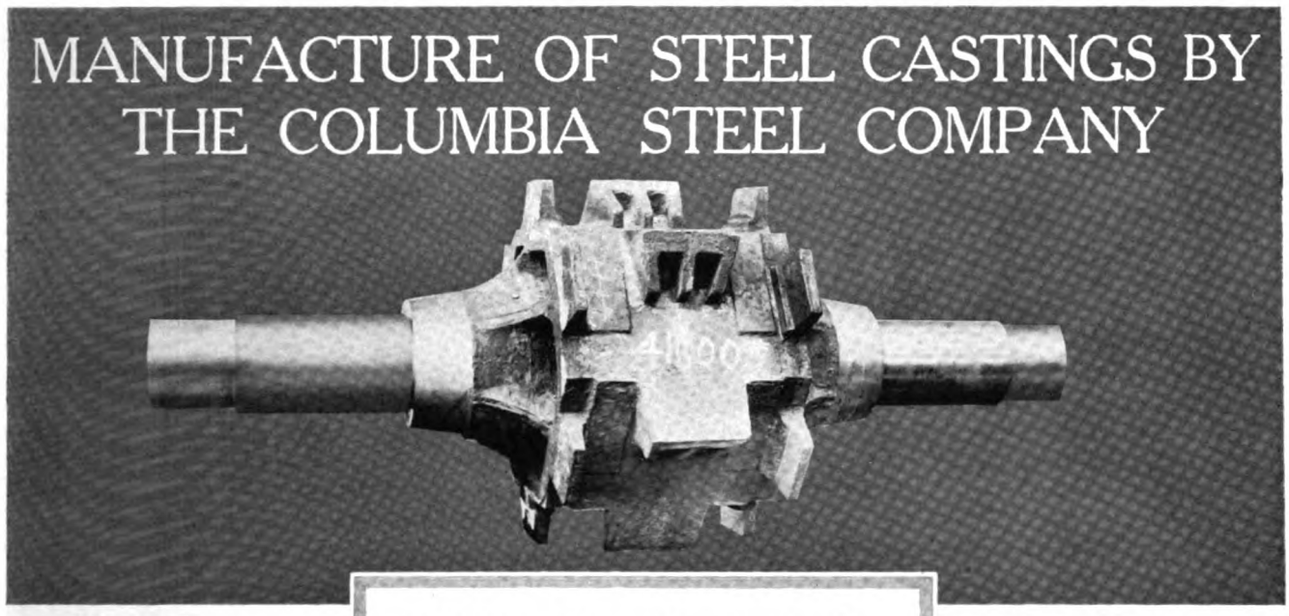
MANUFACTURE OF STEEL CASTINGS BY THE COLUMBIA STEEL COMPANY



THE obstacles in the way of establishing a steel-casting industry on the Pacific Coast included the relatively small market, which has prevented specialization in any one plant, long haul on certain raw materials, and an insufficient supply of skilled labor. In spite of these and other difficulties, the manufacture of steel castings is now being conducted on a large scale. This article describes the largest plant, which alone has an output twice the total pre-war production on the Pacific Coast.

THE expansion of the metal industries of the Pacific Coast to meet the war needs of the Federal government is exemplified by the Columbia Steel Co. The present output of the Columbia company alone exceeds 1200 tons of steel castings per month, which is more than double the pre-war production of all the plants on the Pacific Coast. The company made all the steel castings for the 66 destroyers and 18 submarines built on the Coast, together with the stern-frames for the ships built on the Coast for the Emergency Fleet Corporation, with the exception of ten that came from the East. The regular output of the company for the past year has been 40 stern-frames per month. All this Government work has been delivered on schedule time, and, in addition, the company has handled the necessary repairs for its old customers.

The operation of a steel plant on the Pacific Coast presents many difficulties that are not met by Eastern manufacturers. Some of the necessary materials cannot be obtained locally, and, in other cases, the quality of the local materials is poor. Steel scrap cannot be obtained sorted as to quality and size, but must be collected from all possible sources, in whatever shape and quality that is available, and then worked up at the foundry. Since the demand for steel castings on the Pacific Coast is relatively small, quantity production is not feasible, and foundries are compelled to accept orders for a large variety of work and for comparatively few pieces from each pattern. Skilled mechanics are scarce and the steel plants are obliged to depend mainly on men trained in their own shops. The training process takes considerable time, since, because of the great variety of work done by each shop, the all-round workman is needed rather than the man that has learned to do but one thing. The foregoing indicates some of the many problems that had to be solved by the pioneers in the steel-casting business on the Coast, and it is because of their ingenuity and perseverance that a large measure of success has been attained.

Castings from the Pittsburg plant are sold over a wide territory, extending from Alaska to Mexico and from Montana and Utah to the Philippines. The largest casting made at the plant weighed 56,000 lb. and required the melting of 92,000 lb. of metal.

The California plant of the Columbia Steel Co. is situated at Pittsburg, Contra Costa county, approximately 40 miles from San Francisco. The company owns 25 acres of land with a frontage of 1000 ft. on New York slough, a navigable arm of the San Joaquin river. The company has two docks, and a considerable part of its supplies are handled by water. The property is also served by the Southern Pacific, the Santa Fe, and the Oakland, Antioch & Eastern railroads.

The foundry proper is housed in three adjoining buildings of fireproof brick-and-steel construction. Bays No. 1 and 2, which are 60 by 600 ft. and 60 by 300 ft. respectively, are devoted to molding. Bay No. 3, which is 40 by 500 ft., contains the furnaces and core-rooms as well as a molding-floor.

The furnace equipment consists of one basic open-

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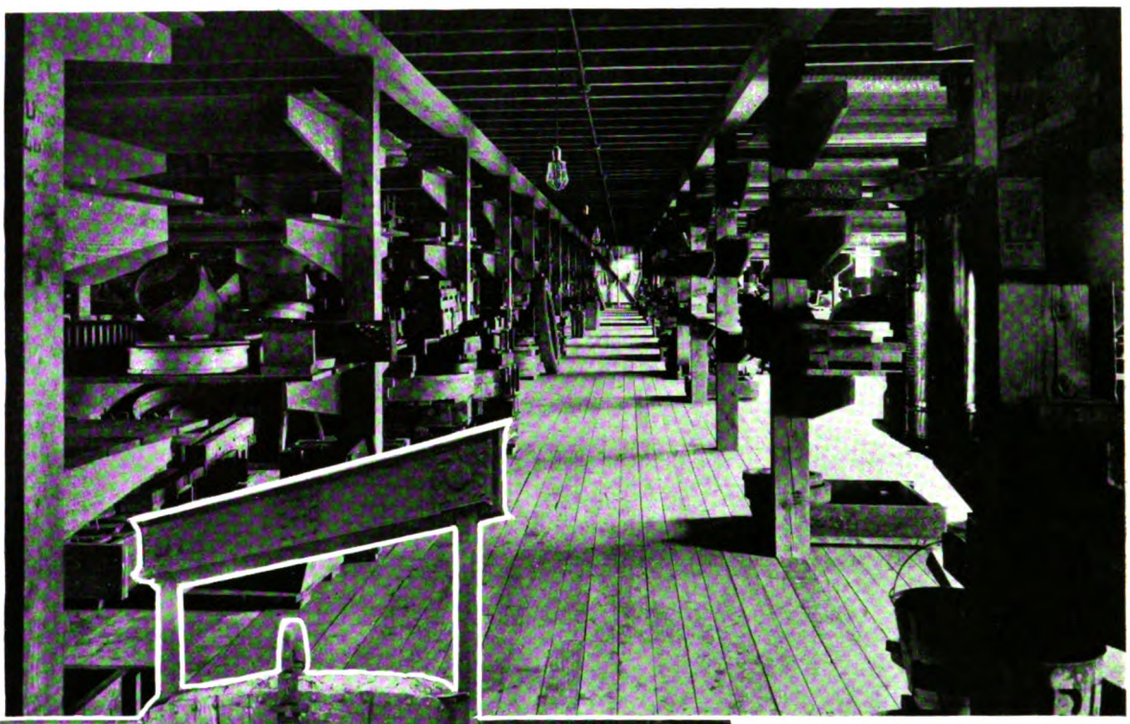
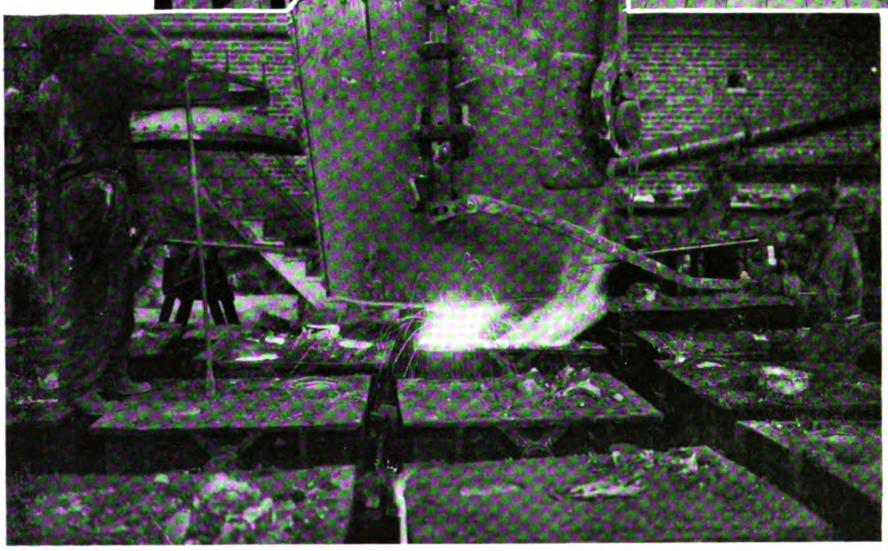
hearth furnace with a capacity of 30 tons and one acid open-hearth furnace with a capacity ranging from 3 to 12 tons. Both furnaces are oil-fired. Steel scrap is used entirely in the basic furnace. In the acid furnace a mixture composed of the scrap from the basic furnace together with approximately 8% of low-phosphorus pig is employed. A second basic furnace, which will have a capacity of 40 tons, is now being erected. This addition will permit the operation of the plant at the present capacity when one furnace is shutdown for repairs, and will also permit the production of castings larger than the present melting capacity of the plant, for which there is a considerable call. Three heats a day are tapped from the furnaces. The average life between relinings is 370 heats for the basic furnace and considerably over 1000 for the acid furnace. This is as good as the standard Eastern practice for oil-fired furnaces, and is perhaps somewhat better than the Eastern standard for the basic furnace, when it is considered that the feed is all scrap. The furnaces are charged with a standard type Wellman-Seaver-Morgan charging machine.



INTERIOR OF BUILDING USED FOR STORAGE OF PATTERNS



POURING INTO MOLDS

Most of the supplies are obtained locally. Magnesite, iron ore, dolomite, and limestone are mined at various localities in California. Ferro-manganese, ferro-chrome, and ferro-silicon are obtained from the plant of the Pacific Electric Metals Co. at Bay Point a few miles away. Silica sand is brought from Illinois. Chrome and magnesite brick and alloy metals other than those mentioned above are also brought from Eastern sources.

As the scrap is received uncut and ungraded, a large yard is required. The yard is equipped with shears, a skull-cracker, and oxy-acetylene outfits for working up the scrap. A locomotive crane, with electro-magnetic equipment serves the yard. The charging-cars are loaded in the yard and are hauled to the furnace-floor by a cableway. Foundations are now being laid for a gantry crane of 15 tons capacity, which will be 34 ft. high and have a span of 80 ft. This crane will facilitate the unloading and handling of scrap.

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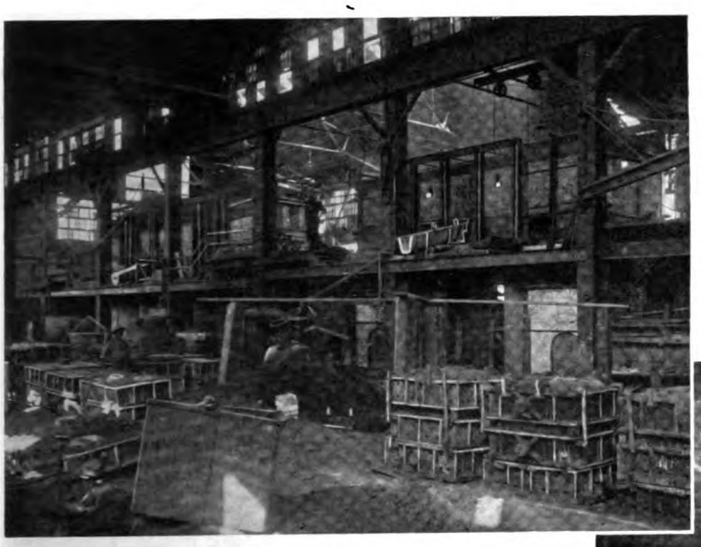
Local molding-sand is used. It is prepared by four Simpson mills made by the National Engineering Co. The sand is distributed by the crane in steel dump-buckets of 1½ yd. capacity. Except for some of the small work, where wooden flasks are used, the flasks are made of cast steel. A jarring machine with a 6-ft. table and eight squeezer machines are part of the molding equipment. Most of the molding, however, is done by hand.



POURING SIDE OF FURNACES

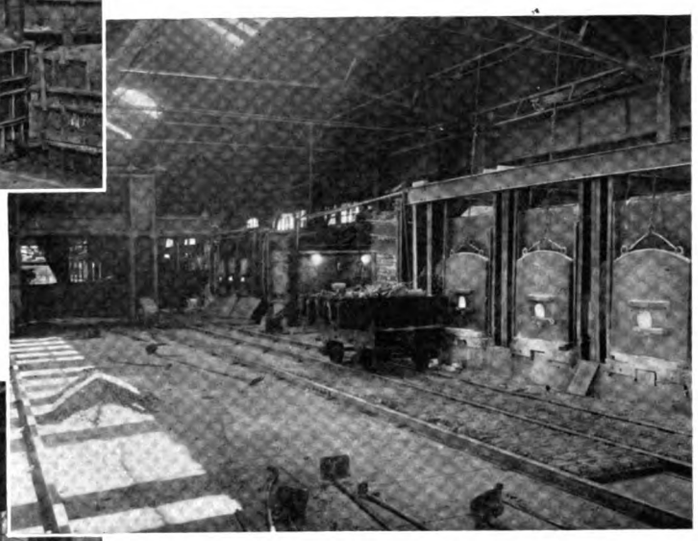
Practically all the molds are baked. There are four oil-fired ovens served by steel cars upon which the molds are stacked by the cranes. There are two concrete pits, 18 and 25 ft. deep respectively, placed in front of the furnaces to facilitate the pouring of large molds. Most of the castings are annealed, for which work two large oil-fired ovens are provided.

MOLDING-BAY DEVOTED TO LIGHT WORK

The main bay is equipped with four cranes, one 40-ton, two 30-ton, and one 10-ton. Bay No. 2 has one 30-ton an one 10-ton crane and bay No. 3 has two 5-ton cranes. Jib-cranes provided with Ingersoll-Rand pneumatic hoists are placed at several points. Two single-line grab-buckets built by Pawling & Harnischfeger, of Milwaukee, are used for cleaning the floors after pouring. These are operated by the traveling cranes.

The cleaning department contains the largest sand-blast outfit in the country. It consists of two large chambers together with the necessary blast and dust-collecting equipment. Castings are taken into the chambers on cars and cleaned without being handled. All equipment was furnished by the Pangborn Corporation. The cleaning department also contains four swing and four stationary grinders and a number of pneumatic chippers. The castings are trimmed and the gates and risers are cut with the oxy-acetylene torch. An electric welding outfit is also used.

In the power-house, which is of brick, there are two oil-fired return-tubular boilers, which provide steam for atomizing the oil in the various burners throughout the plant. There are five Ingersoll-Rand two-stage compressors with a capacity of 500 cu. ft. of free air per minute, connected by short belt-drives to 75-hp. Fairbanks-Morse motors. Air is piped to all parts of the plant and is used for a large number of labor-saving devices such as hoists, chippers and sand rammers, squeezers, and jars. When necessary, air can be used in place of steam in the oil-burners.



CHARGING-FLOOR

A large core-room is equipped with the necessary mixing-mills. There are machines for making the standard sizes of round and square cores. There are two oil-fired drying-ovens served by cars so that the cores can be dried without being taken from the racks.

The company has a shop for making both wood and metal patterns. A three and one-half story building 75 ft. wide by 180 ft. long is devoted entirely to the storage of patterns. A walk through this building gives the visitor an idea of the range of work done by the com-

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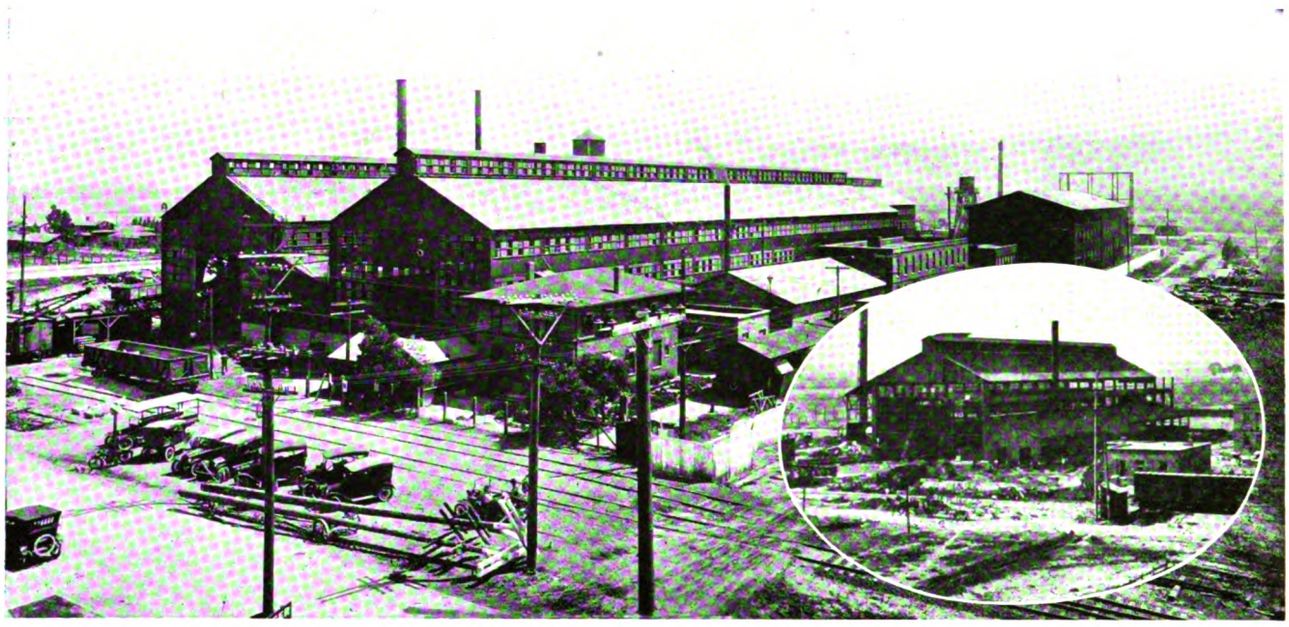
pany. On one floor may be seen patterns for castings for a dredge in Alaska, for a sugar-mill in the Hawaiian Islands, and for a wireless station in the Philippines, as well as locomotive drive-wheels, torpedo-tubes and stern-farmes, anchors, and other ship castings.

A chemical and physical laboratory is maintained for furnace control, for analyzing materials, and for making the standard tension and bending tests. For testing anchors there is an Olsen anchor-testing machine with a capacity of 400,000 lb. This is the only machine of its kind on the Pacific Coast. The company makes a specialty of anchors of the Admiral type and now manufactures them up to 5 tons in weight. Testing these anchors includes dropping each piece on a steel floor from a height of 12 to 15 ft. depending on its weight. Following this test, each completed anchor is subjected to a pull on the Olsen machine equal to the breaking strain of the chain used on this particular size of anchor.

The management believes in looking out for the comfort and safety of its employees. The men are protected as much as possible by safety devices. A well-equipped emergency hospital in charge of a trained nurse is maintained to care for accident cases. A pulmotor is part of the equipment.

A comfortable boarding-house is provided by the company for the single men, where they can have clean bed-linen twice a week, plenty of hot water at all times for bathing, and good board, all at considerably less than cost. The management believes that the money lost on the boarding-house is more than repaid by the effect of good housing and boarding conditions upon the men.

The Columbia Steel Co. also maintains a plant at Portland, Oregon, which was the original works established in 1903. This is equipped for the manufacture of convertor steel entirely.



GENERAL VIEW OF PLANT. INSERT SHOWS THE ORIGINAL BUILDING CONSTRUCTED IN 1910

Sinking of the 'Unsinkable' Ship

The reputation of the so-called unsinkable ship 'Lucia', which was torpedoed by a German submarine, was defended by the crew when they reached New York after being rescued by an American destroyer. The 'Lucia' was originally an interned Austrian ship. After being seized by the Federal government, she was equipped with six thousand 1 by 2 by 3-ft. bouyancy-boxes between the frames and between the deck-beams, and approximately the same number of boxes in various parts of the cargo-space. On October 17, a torpedo struck the ship in the engine-room section amidships. The vessel settled slightly but held an even keel for several hours. As the engines had been destroyed, the vessel could make no headway and rolled badly. Finally, the deck-load of motor trucks came loose and rolled about the decks. Soon they broke through the hull in so many places that the vessel sank about 24 hours after being torpedoed. The loss of the vessel was caused by the damage from the trucks, and only indirectly by the torpedo.

CHURCH—Why, this typewriting is awful! Look at all the wrong words in the letter.

Gotham—I know. My typewriter is like all the other women. She's using substitutes.

"Now, then," said the professor, "what is your idea of a nervous force?"

"The police when they are being investigated," replied the bright student.—'Philadelphia Press'.

IT beats all how much scrap there was until the price went down.

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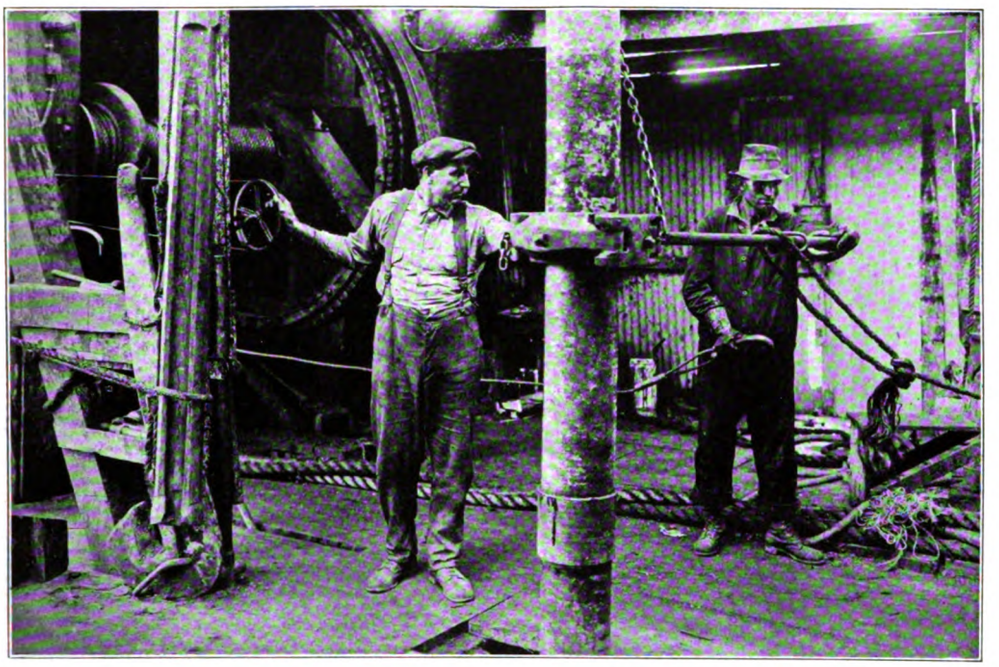

TIGHTENING CASING

The Oil Industry and the Metal Trades

By A. T. PARSONS

THE oil industry, which is one of the largest markets for machinery and other metal products in the State, is supplied almost entirely by Eastern and Los Angeles manufacturers. The reasons why the metal industries of the San Francisco Bay district have hitherto obtained but little of the oilfield trade are discussed as well as the kind of supplies required.

THE value at the well of the oil produced in California in 1917 was $86,000,000. This is twice the value of all metals produced during that year and is greater than the production of gold during any year. In addition, the natural gas produced was worth several millions. The value of the 1918 production will be considerably greater, since the amount produced has increased slightly and the price is at least 50% higher at the well than in 1917. Allowing for the increased value of refined products, it is probable that the value of petroleum and petroleum products will reach $200,000,000 in 1918.

Oil was discovered in Ventura county in the early 'sixties, the first commercial production being in the 'seventies. The development of the Los Angeles City field in 1893 and of the Kern River field in 1899 put the oil industry of the State 'on the map'. Geological conditions in most of the Californian fields make drilling, even of relatively shallow wells, more difficult than in most other parts of the world. During the past 10 or 15 years the development of a great deal of deep territory has called for the solution of many difficult problems. In general, oil operations in California call for heavier equipment and greater skill in handling that equipment than in any other oil region. Californian drillers and equipment designed to meet Californian conditions are in demand in every oilfield in the world. Yet most of that equipment comes from the East and practically none of it is manufactured in the San Francisco Bay district.

There have been several underlying causes for the fact that, although the San Francisco Bay district has been an important producing centre of mining machinery for sixty years, practically no oil-well supplies are made, while the manufacture of such supplies is one of the largest industries of the Los Angeles district. The relatively shallow wells first developed permitted the use of light equipment such as is used in water-well drilling. The first well in the Los Angeles City field, instead of

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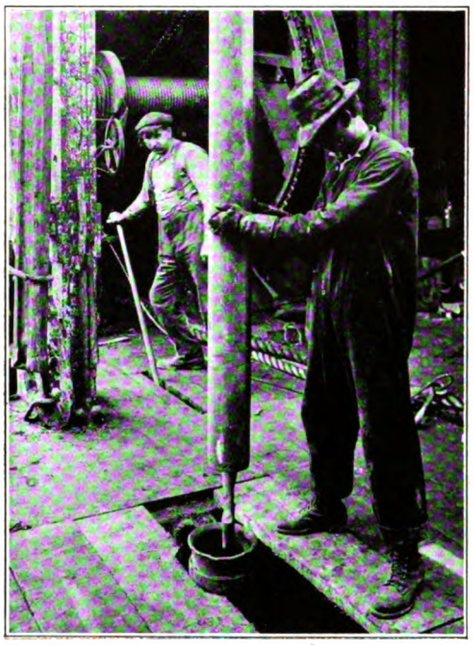
being drilled, was dug with a pick and shovel and windlass. For many years the total amount of work was too small to permit the economical manufacture of equipment. The little jobbing work that was done naturally centred in Los Angeles, the nearest large town to the wells then producing. Later, when the fields grew in importance, and the volume of work increased sufficiently to encourage manufacturing operations, some of these same jobbing shops commenced quantity production. Transportation charges have also been a factor, but their importance has been exaggerated. Los Angeles shops have, of course, a large advantage when it comes to trade with the oilfields of Ventura, Los Angeles, and Orange counties, but there is little difference in the freight-rates from the San Joaquin Valley and Santa Barbara County fields to either San Francisco or Los Angeles. Most of the manufacturing in Los Angeles shops is, however, of particular specialties or lines of specialties. Some of these firms have developed a profitable trade for their special tools not only in California but in the Oklahoma, Kansas, and Texas fields. A noteworthy exception to the specialty firms is the Union Tool Co., which manufactures practically every kind of oilfield machinery and tools at its shops at Torrance, just outside of Los Angeles. Several shops have been established in the fields themselves, but these do mainly jobbing work. Metal oilfield equipment may be divided into three general classes: heavy supplies, such as casing, line pipe, tubing, plates and sheets for tanks, and wire rope; machinery, such as engines, boilers, and pumps; and small supplies, such as valves and hardware. The economical production of heavy supplies on the Pacific Coast is, of course, impossible until large rolling-mills and other works are established. Fabrication of tanks is done by many Pacific Coast firms. It might, however, be mentioned that the possible business in these lines is great enough to justify a considerable investment, provided other conditions favorable to economical production can be obtained. During 1918, 700 wells were started in California. To complete these wells will probably require at least 100,000 tons of casing, 10,000 tons of tubing and pump-rods, and 2000 tons of wire rope. In addition, several thousand tons of rotary-drill stem, line pipe for oil, gas, and water lines, and plates and sheets for tanks will be required. The number of wells drilling will increase for some time to come with the increased demand for oil and the greater ease in obtaining supplies now that priorities have been relaxed.



'RUNNING THE BAILER' WHED DRILLING WITH CABLE TOOLS

ATTACHING TEMPER-SCREW TO DRILLING-CABLE

The steam-engine used for drilling has become standardized, and the difference between the various makes used is nominal. The favorite sizes are 23 and 30 hp. Most of the engines in use are manufactured in the East. Probably no other machine is called upon to stand so much hard usage as the drilling-engine. Rapid variation of load, sudden reversing, and tremendous overloads are all in the day's work and, for the most part, cannot be avoided. In fact, oil-well machinery, in general, must be designed for heavy overloads, since experience has shown that, the overload periods being relatively infrequent, it is cheaper to buy a reasonably powerful machine and overload it occasionally than to use a machine rated to handle any load that might come upon it,

Steam-engines formerly were used for pumping, but this is not economical. This and similar methods of wasting fuel-oil were common in the oilfields at one time, based on the fatuous belief that, because fuel-oil was produced on the property, its cost might be neglected. This was a mistake even when oil was sold for only 15 cents per barrel at the well; at the present prices the error becomes evident to anyone. Nowadays, no one

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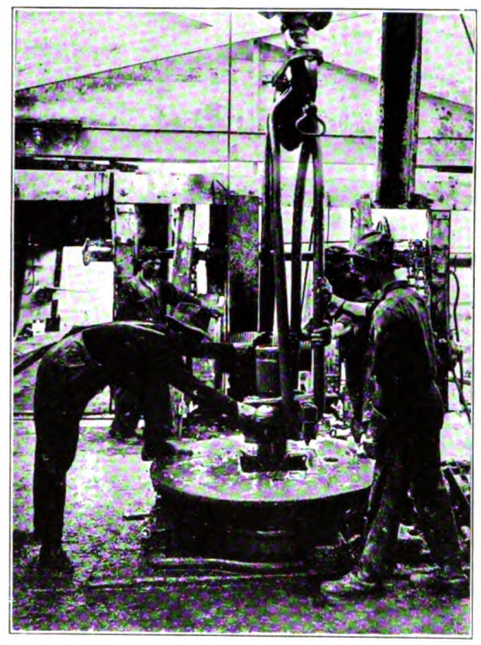
pumps a well with steam-power if gas or electricity can be obtained.

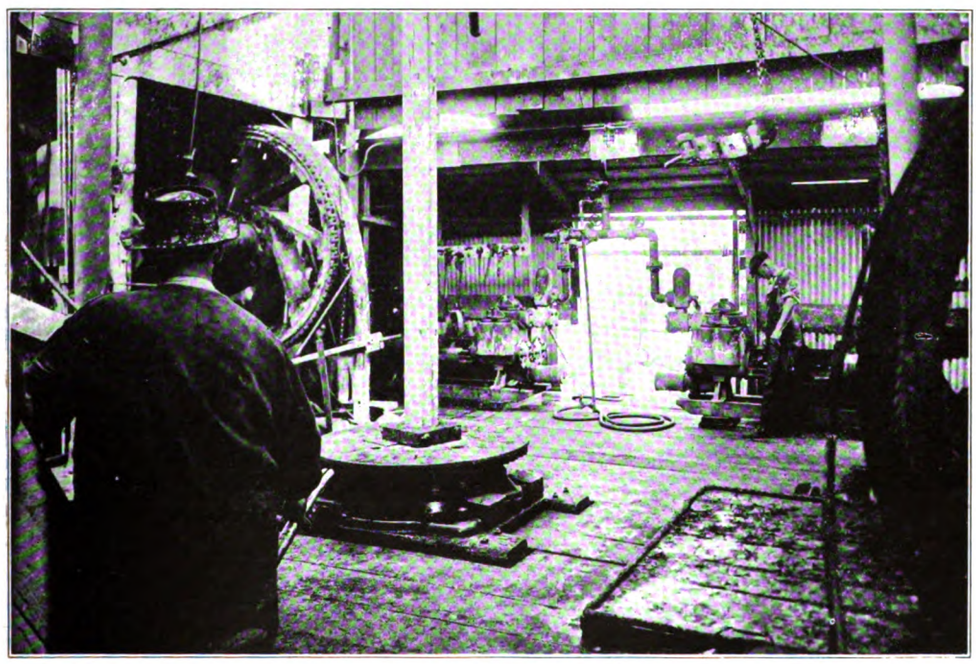
The labor cost of pumping by gas-engine is greater than by electric motor, but it frequently happens that the wells on a property produce gas enough to run the engines, which could not be sold or otherwise used, thus actually costing nothing. Whether, even in this case, the gas-engine is the more economical is a disputed question. The general practice is to use gas-engines until the gas gives out, which is usually long before the oil, and then put in motors. Little progress has been made in the introduction of heavy-oil engines. This may be because of some inherent characteristic of this type of engine that renders it unsuitable for oilfield service, or it may be because the engines so far offered to the operators have not been designed with a view to oilfield conditions, or it may be simply because of the conservatism of oil-operators and oil-workers.

That the conservatism of operators and workers can be overcome is shown by the increasing use of electric motors for both pumping and drilling. Ten years ago motors were unknown in the Californian oilfields. The first motors introduced did not meet with favor. There was the conservatism already mentioned to fight, but also the designers appeared to have gone on the principle of building a machine that would give the operator the service they thought he ought to have, regardless of what he really wanted. But the electrical manufacturers persevered, with the co-operation of power companies, who were attracted by the nearly 100% load-factor of the oilfields load. The designers studied the operators' viewpoint as well as field conditions, and produced a type of motor that has increased in favor until a large proportion of the wells in California are now pumped by electricity. Even after the electric motor had proved itself suitable for pumping and for pulling tubing and pump-rods from the well during cleaning, it was not considered capable of drilling service. During the past years, however, a number of wells of various depths have been



ATTACHING ELEVATORS TO DRILL-STEM, WHICH PROJECTS JUST ABOVE THE ROTARY TABLE, PREPARATORY TO PULLING DRILL-STEM.

drilled successfully with electric motors, using cable tools, and the use of motors for drilling where cable tools are employed is increasing. So far, the steam-engine is the only prime-mover that can withstand successfully the severe usage of rotary drilling. The gas-



DRILLING WITH ROTARY TOOLS. THE DRILLER IS STANDING AT THE LEVER CONTROLLING THE ROTARY TABLE. A HELPER IS PACKING ONE OF THE 'MUD' PUMPS

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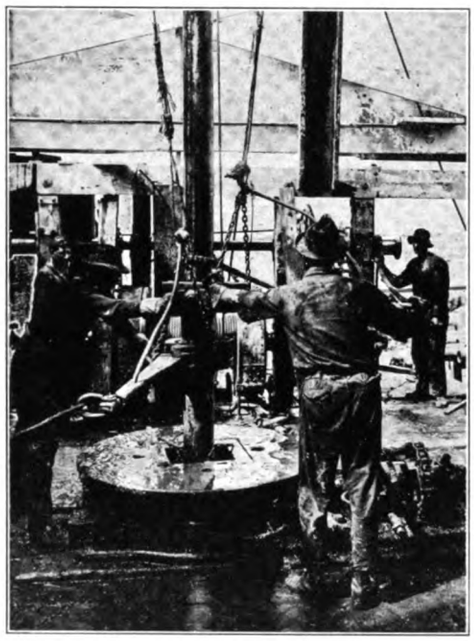
engine is not suitable for drilling of any kind, being used only for pumping and pulling.

The boilers used in oilfield service resemble those in any other similar stationary service. On individual properties the size of units varies from 40 up to 150 hp. On main-line pumping-stations the units are larger, up to 500 hp. The poor feed-water available in many of the fields necessitates much 'scaling' and frequent renewals of tubes. Nearly all of the boilers used are manufactured in the East.

Nearly all of the surface pumps used are of the direct-acting duplex type. They are of three general classes, oil-line pumps, 'mud' pumps for rotary drilling, and miscellaneous auxiliaries such as feed-water pumps. Oil pumps in main-line service operate at working-pressures of 600 to 1000 lb. per square inch and are specially designed for handling the viscous oil. 'Mud' pumps handle very muddy water from which it has been impossible to remove all grit. The ordinary working-pressure is relatively light, but occasional overloads may be expected, sometimes as great as 1000 lb. The smaller pumps do not differ from those used in similar kinds of service. The Dow Pump & Diesel Engine Co. and the Union Tool Co. both manufacture pumps for all kinds of oilfield service, but most other pumps come from the East.



UNSCREWING 6-IN. DRILL-STEM. THE UPPER TONGS ARE OPERATED BY THE CAT-HEAD AT THE REAR.

The rotary table is a special machine used in rotary drilling for gripping the drill-stem and thus turning the auger-bit at the bottom of the drilled hole. The varying resistance met by the bit subjects the table to heavy stresses and other hard usage. Rotary tables are made of steel castings and forgings and weigh from 4000 to 7000 lb. Most of them are made in the East.

Wells are pumped with deep-well plunger pumps. The viscosity of the oil and the large amount of sand pumped with the oil in most wells, compel differences in design as compared with the ordinary water-well pump. Small engine-driven pumps of special design are frequently used to deliver oil from a particular well to the main tank.

Drilling the well, handling the casing, and, in the case of cable tools, bailing the well requires a number of pulleys, drums, sprocket-wheels, and other hoisting apparatus, whether cable or rotary tools are used. The total weight of metal for these uses for each drilling-well is several tons. Most of this apparatus must be used occasionally after the well is completed and producing, and is therefore left in place.

The churn-drill bit employed in cable drilling is used with 'drilling-jars' to take up the impact when the bit hits bottom on each stroke. The bit is also usually weighted with a drill-stem and sometimes a sinker between it and the drilling-cable. The total weight is about two tons. The auger-bits used in rotary drilling are of several kinds. Many ingenious designs have been made for special rotary bits for use when drilling in hard rock, admittedly the hardest problem with a rotary outfit.

The fact that something breaks every now and then, and leaves a mess of drilling tools, cables, tubing, or pump-rods at the bottom of the hole has led to the devising of many ingenious kinds of 'fishing tools.' Most of these are designed especially for the particular mishap, but repetition of the same kind of accidents has led to quantity production of many tools for these purposes.

Pipe fittings of all kinds, from a 12-in. gate-valve to a $\frac{3}{4}$-in. union, and for water, steam, gas, oil, and compressed air are used in large quantities in the oilfields. Most of these are standard, but the special needs require a number of special designs. The small tools used in the blacksmith's, carpenter's, plumber's, and several other trades are also required. Many other kinds of tools and equipment are needed. An idea of their number may be obtained from the fact that the catalogues of the oil-well supply houses contain 500 or more pages.

This article has been confined to the equipment used in the production and transportation of oil. No attempt has been made to discuss the tanks, stills, pipe, fittings, and pumps and other machinery used in the refining of oil.

Note. The illustrations for this article were taken, by permission, from the 'Standard Oil Bulletin.'

My sister Maggie is a very fortunate girl." "Yes? Why?" "Dunno. But she went to a party last night and played blind man's buff all evening. The gentlemen hunt around and find a girl, and then they must either kiss her or give her a shilling." "Yes?" "Maggie came home with thirty shillings and a war bond."—Tit-Bits.

"The evidence shows, Mr. Mulcahey, that you threw a brick at Policeman Rafferty," said the Judge.

"It shows more than that, your Honor. It shows that I hit him."

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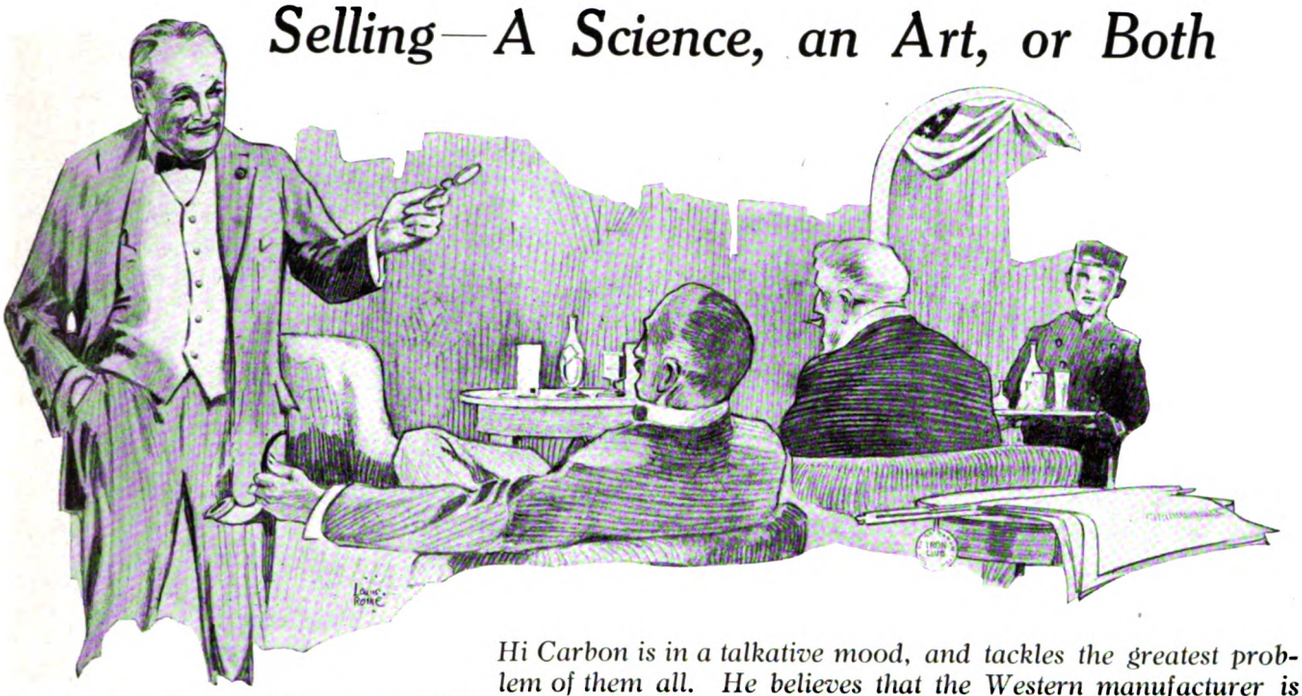
Selling—A Science, an Art, or Both



Hi Carbon is in a talkative mood, and tackles the greatest problem of them all. He believes that the Western manufacturer is facing the opportunity of his life to build a big industry, and gives his reasons why. "Everything worth while takes nerve," says Hi, and this is not lacking in the Western make-up."

"LOOKS like rain," said Pettigrew, as he leaned forward in his chair and looked out of the window at the Iron Club. "Same old bromide," answered Smithers, who had just come in, "Whenever a man is absolutely out of conversation he talks about the weather. The elevator man in our building has been riding me up and down for five years, and I have never heard him say anything more profound than, 'Fine day.' Here he comes now."

"Who, the elevator man?" grinned Pettigrew. "No, dear old thing," returned Smithers, "Hi Carbon, of course, and, for the love of Mike, watch him get out of that flivver."

Hi was the cynosure of two interested pair of eyes while he threw the painter overboard, made fast to the moorings, then the street-door swallowed him. Finally he appeared, panting and puffing and made for the familiar leather-covered easy-chair beside his two brothers-at-arms.

"Why don't you get an automobile, instead of that thing?" said Smithers, disdainfully. "Have a heart," puffed Hi. "The elevator is out of whack as usual, and I had to run up two flights of stairs. Am I to die of thirst, or am I to be talked to death"?

"Don't fuss, here you are," said Smithers, handing Hi his medicine. "You were about to say——" "Yes, I was, and am," answered Hi, who by that time had recovered his breath. "Don't you know that that machine of mine is one of the great examples of American accomplishment? That's the trouble with a lot of you fellows. You just take things for granted, without digging down into the whys and wherefores. You laugh at the flivver jokes, and read all the stories in the funny papers, while, in reality, you are giving the manufacturer of that car millions of dollars worth of advertising for nothing.

"Everybody talks about them, from the man on the street to the vaudeville artist on the big time. And you know," said Hi, impressively, "if you can get a lot of people talking about you, and what you sell, half the battle is over. It doesn't make so much difference what they say, so long as they say something. The man who doesn't do anything at all is the man who is never talked about at all. He hasn't even made a nick in his own home town. Now take this flivver you have been sneering at, for example. Up to the beginning of the War, they were turned out at the rate of two a minute for every working day. Did you ever stop to think of what forces were harnessed to make the people absorb that many cars?"

"Sounds like a big contract," said Pettigrew, thoughtfully, "yet you can't cross Market Street anywhere without running the risk of being smashed into by a couple of dozen of them."

"All right," returned Hi; "the outstanding fact about those little cars is their low price and general serviceability. Dollar for dollar, you get more for your money in that car than for any other on the market. The low cost resulted from quantity production and intensive factory organization to the *n*th degree. The materials start at one end of the shops and come out at the other as finished cars, and there is hardly an interruption between stations. On the other hand, that organization was not created overnight, spectacular as its growth has been. The design as it stands today represents the

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elimination of the non-essential, absolutely. No detail was too small to escape scrutiny. A change saving a cent per car, when multiplied by 300,000 cars, runs into money mighty fast. No sir, I tell you again, the thing that sold that car was price; the thing that made it stay sold, and helps to sell others was service."

"This leads up to the general question of selling, the biggest problem of them all, and at the same time shows that manufacturing and selling are Siamese, rather than Gold Dust twins. The Siamese twins, you remember, were joined together, and neither could live if they were cut apart. So it is with the two ingredients of commercial success, good goods and good salesmanship."

Pettigrew was interested. "Now, according to what you say, Hi," said he, "you must get a volume of trade to keep your cost down, so you can sell your product wholesale and thus get a volume of trade. It seems to me that you have drawn a circle that neither starts nor ends anywhere. Suppose that I want to develop a standard line of something in my shop, and want to put in some time working it up now, so that I will be ready to spring it when Government orders are all cleaned up, what will I do, and how will I go about it?"

"First, you must start right," said Hi, "and starting wrong smashes many an otherwise good business enterprise. The first thing to do is to decide, tentatively, what you are going to make; what your plant is suited to produce. The next step is to study the possible market. This, in turn, involves close scrutiny, not only of your prospective competitors' goods, but his marketing methods also. How much does he charge, and through whom does he sell? Then his general sales policy comes in. Does he market through direct factory representation, through dealers who stock his goods, or through a manufacturers' agent who works on commission? How does he advertise; what papers does he use; is his advertising directed toward the creation of dealer demand, consumer demand, or good-will by the establishment of a brand or trade-mark? Does he carry a stock on consignment with dealers, in a warehouse with his direct representative, or does he deliver to dealers only on firm orders?

"These are only a few of the things to be considered before you go ahead," resumed Hi. "Remember this, that the consumer wants something that offers some concrete inducement to make him buy. He insists upon good service at a price no greater than he can buy similar goods elsewhere. The dealer wants goods that will give good service so that they will stay sold, and that will sell at a price that will give him a fair margin of profit. And on this profit question, you must remember that if you can clear 10% on your factory output you are doing well, while the dealer must get about double that, or more, in order to make it pay to handle your goods. The reason for this difference lies in the comparative volume of trade, and the greater credit risk in retail trade as compared to manufacturing."

"Sounds like a big job," said Smithers. "And a long job, too," rejoined Pettigrew. "I would probably be as old as Methuselah before I commenced to get results if I tackled a job like that."

"Don't you believe it," said Hi; "there isn't one of these big organizations that was created overnight. On the contrary, it is a slow process of building up. Every one of these big fellows, whose product is known equally well in the four quarters of the earth, had to make a beginning some time. They made mistakes too, lots of them, and had their periods of discouragement, failures, and all the other pains that attend any process of growth."

"Still," said Pettigrew, "you must admit that it will take some nerve to go up against these big fellows with all their money, organization, and factories, to say nothing of their good-will."

"If I didn't think you fellows had a certain amount of nerve I wouldn't be wasting my breath talking to you," said Hi. "Of course it takes nerve. Everything worth while takes nerve. What kept the Germans out of Paris in 1914, and out of Verdun in 1916? The nerve of a few Frenchmen who didn't know how to quit. What was it won the War for us? Nerve. What is going to keep our forge and foundry fires burning now that the War is over? Also nerve. Now listen a minute. I really mean what I say. There isn't a one of you who can't, if he will, go to the bat and work out this problem in a way that will keep the tools turning over, furnish employment for a lot of men, preserve the Western metal trades industry, and, incidentally, make him a welcome visitor at his banker's.

"The first thing to do is to make up your mind what you want to make. Take plenty of time deciding what that will be. Hustle around and find out what your shop is adapted for, investigate the market and all the other things. You will be surprised to see that the job isn't so difficult as you think. If you decide to tackle something that is sold through dealers, pick out say one dealer and start in to campaign with him. The dealer will be interested in anything that promises him a chance to make some money. Don't forget that. Your sales talk to the dealer will be based upon superior service with fair prices and discounts, probably. There is no sense in cutting prices below market values. You will have an advantage on deliveries, and, if you can do a reasonable amount of financing, you may be able to carry a considerable stock yourself, thus relieving the dealer from tieing up his money. There is another advantage in carrying a fairly large stock yourself, and that is you can manufacture in quantity batches, cleaning up each batch as you go along. This is what makes the low costs. Warehousing doesn't cost much, and neither does insurance on iron, steel, and brass goods."

Smithers and Pettigrew were now listening attentively. "How is a man going to raise all that money," said Smithers. "Sounds like a job for Rockefeller, or one of those fellows."

"Not at all," said Hi. "The thing to do is to make a modest beginning. Don't overstrain your financial resources right at the start. If you do that, one mistake

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or error in judgment will put you on the rocks. Build up your trade by degrees. Try and make your changes in design on paper, not in the shop. Thus you will keep your scrap-pile down within reasonable limits, and not have to write off so much profit and loss at the end of the year. The scrap-pile is the mile-stone that marks the road of progress. A whole lot of people contribute to the scrap-pile, too. It isn't necessarily the man who starts things that finishes them. The whole history of the manufacturing industry is full of cases of initial failure and ultimate success. Frequently it is the pioneer who is the goat. 'Where is the captain of industry of yester year,' as the poet might have said. Kaiser Bill was a starter, but Foch, Haig, Pershing, and the rest of our boys are the finishers. Many a good man conceives an idea and then tries to put it over before it is half baked, with the result that after he goes under, somebody else comes along, takes advantage of what has gone before, and gives the enterprise the necessary punch that carries it on to success."

"Now you know that I want you to do something for yourselves. I believe that a really great opportunity has come to you all, and I am trying to point, in a sketchy way, to the possibilities that lie before you. A man is worse than foolish who does not consider the thing from every angle. It takes careful study, investigation, and planning first, then a good dose of this never-quit stuff, like the Frenchmen at Verdun, and a good, steady hand at the wheel all the time. Make haste slowly, don't hesitate or take any backward steps. Others are doing it. There are some real factories here in your own town, right under your noses, in fact. They have been going about their business so quietly, so methodically, and so efficiently that they are better known on the outside than to their next-door neighbors."

"Tell us about them, Hi." said Pettigrew. "I would certainly like to hear something practical after all this theory talk of yours."

"Too late, boys," said Hi, looking at the hall-clock; "I have a date for a Red Cross meeting at six and will have to hustle as it is. We will continue this session again in a few days. In the meantime, get out your sharp pencil and do some figuring. It will pay in the end. Good-night."

CHINA has qualified for the big League of Nations. The 'Peking News' prints this wail from an "Old Subscriber" in Tientsin:

"Can we hope for any improvement in the long-distance telephone situation? A few days ago I called up Peking about 3 p.m., and was informed that there were 60 calls ahead of me, and that there were only three trunk lines in operation. I finally got the call about 10 p.m. Surely the Chinese administration can put in another trunk line and make this one-time fine service of use again to business men.

"The Peking long distance service is almost as bad as similar services in Japan."

Occupied Area in Northern France Damaged During German Invasion

Roughly speaking, one-seventh of the total area of France has at one time or another during the last four and a half years been in the occupation of the Germans. This so-called invaded region (now *régions libérées*) comprised the following territory:

Department of Nord: All, excepting a small area along the coast.

Department of Pas-de-Calais: The eastern third, comprising an important part of the coal-mining basin.

Department of Somme: The eastern half, which suffered damage as a result of the German thrust toward Amiens in the spring of 1918.

Department of Aisne: The northern half was in German occupation for four years. The area of invasion covered all of the Department after the German push toward Paris in the spring of this year, and until the recent retreat.

Department of Ardennes: All of this Department was in German occupation from the early days of the War.

Department of Marne: The northern fringe only.

Department of Meuse: The part north and east of Verdun, comprising about one-half of the total area.

Department of Meurthe-et-Moselle: The strip stretching northward from Nancy to Luxembourg, in which are situated the iron-ore beds of Briey and Longwy.

All of this invaded region has suffered damage, though the extent and character of the destruction varies greatly in different sections. The region in the north that has suffered most constitutes the richest industrial section of France, and the task of restoration will be herculean.

THE colonel had ridden his horse to town in the afternoon, and it was dark when he returned to camp. Some distance outside the guard-line he was challenged by a voice from the darkness—

"Halt! Who goes there?"

"Colonel," he answered.

"Dismount, colonel. Advance and be recognized."

The officer was certain that there was some mistake, for no guard was supposed to be posted there. But a sentry's orders are not to be disobeyed, so he grumblingly dismounted and led his horse forward, inwardly vowing vengeance against the sergeant of the guard that had caused him all this trouble.

As he approached the sentry he burst out wrathfully: "Who in thunder posted you here?"

"No one, sir. I'm just practising."—'Anaconda Standard'.

AFTER dinner the Rev. John Wolverton preached from the text, "Man shall not live by bread alone." Later ice-cream was served.—Marion (Ill.) Republican.

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Reconstruction of Disabled Soldiers

By CONSTANCE DREXEL

"I DON'T mind dying for my country," has been the thought in many of our brave boys' minds—"but kill me rather than leave me disabled the rest of my life." Small wonder, for they remember the cripples of old peddling pencils or shoestrings down the street. But times have changed. No need for our boys to worry, or their families to wonder who will care for them in case they come back from war with loss of limbs or worse.

Uncle Sam has stepped in. The problem is occupying a great deal of attention at the office of the Surgeon-General of the Army, supplemented by all the Red Cross can do to help. The Red Cross publishes 'Carry On', the magazine the Surgeon-General's Office is getting out on this subject. It is free to those interested. The Red Cross is also issuing pamphlets of information free, in the effort to popularize this new attitude toward cripples, that we are not going to have any more cripples in America either from the war or from injuries received in industry.

To prove that this can be done, the Red Cross maintains, at 311 Fourth avenue, New York, the Red Cross Institute for Crippled and Disabled Men, the head of which is Dr. Douglas C. McMurtie, a pioneer of this new attitude of society's duty toward a disabled man. At the school, six model courses are given to refit crippled men for their old or for new trades. These are: Manufacture of artificial limbs; oxy-acetylene welding; mechanical drafting, printing, motion-picture operating, and jewelry work.

Briefly, the plan of the Government for the rehabilitation and vocational training of men crippled through the War is as follows: Even in our hospitals in France, convalescent men are shown moving pictures of successful cripples; Thomas Edison, nearly stone deaf, for instance; Michael Downing of Minnesota with both legs, one arm, and one hand gone, president of a State Bank, running his own motor car and a lucrative law practice to boot, married and raising a happy family.

Upon arrival in the great military hospitals under the medical branch of the army, even while still in bed, the process of refitting the men to normal life and responsibilities begins. I saw wounded from overseas at Walter Reed Hospital, in Washington, being taught by reconstruction aids in occupational therapy. Some were busy with basketry or weaving, but others were doing mental work. I remember one man in bed with one leg off, studying shorthand. When the men become able, they are sent from the wards to the finely equipped new buildings known as the curative workshops. Here are classes in motor mechanics, use of the left arm and hand instead of the right, in English and French, in shorthand and typewriting for cases of amputation of legs, telegraphy, rug weaving, artificial-limb making, carpentry, and farming. The principal aim of these classes is to cure the men physically as soon as possible, but even here their vocational training to fit them for their future place in the community may begin. The men who have lost an arm or leg, or who have been otherwise disabled, meet experts who try to guide them to refitting themselves for usefulness.

After the medical authorities can do no more for the

CRIPPLED FRENCH SOLDIERS SOLDERING CANS

crippled man, after they have done all they could to make him as near whole again as possible, including the providing of artificial arms or limbs, even then the Government does not pretend to end its responsibility. Congress has created the Federal Board for Vocational Education. It has the official responsibility for the re-education of soldiers and sailors of the American forces disabled by the War. A definite program has not yet been developed, but the Red Cross Institute already mentioned has demonstrated the general procedure. Crippled men have been taken off the streets, trained in one of the six trades taught there, and placed in lucrative positions where their infirmities are no handicap.

For soldiers to be refitted to civilian life, take a former brakeman on a railroad that has lost an arm. He cannot be a brakeman any longer, but his railroad knowledge can be of use to him. He is trained to become an expert telegrapher or train-dispatcher. A man fitted with one or two artificial limbs can do as much work on a

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linotype machine as an able-bodied man. If he has been formerly employed at a standing job in a printing or newspaper plant that experience can be turned to good account. The point is that a disabled man need not necessarily be trained to an entirely new trade. His former experience should be made to count in fitting him to return to work.

However, details of the re-educational and vocational program are not nearly so important to the working man, be he in the army or in industry (for in either case he is liable to be hurt), as the attitude army authorities, supported by the Red Cross, have assumed toward crippled men.

No longer will the responsibility of army or government or industry cease by merely pensioning a man. He must, and will, be refitted to take perhaps even a better place in the community than he had occupied before his injury. Here, however, it must be pointed out, that Uncle Sam intends pensioning generously all disabled soldiers or sailors. But, and this is an all-important fact, the pension will be granted regardless of a man's earning capacity that he develops in spite of his infirmity. If he does what the Government and the Red Cross want him to do, refit himself for a job, he will have the pension just the same. We shall need all that every man can produce; the more they produce, the cheaper will living expenses become. Therefore, let us have no idlers, no more cripples.

Outlook for Metallurgical Coke on the Pacific Coast

THE establishment of a complete iron and steel industry on the Pacific Coast has been an attractive dream for many years, but, so far, has been nothing more than a dream. The existence of large bodies of a fairly good grade of iron ore has been known for many years, but the development of an iron industry has been prevented, partly by the small market, but principally by the lack of local supplies of coking coal. The industrial growth of the entire Pacific Coast, as well as the demands of foreign trade, now furnish a possible market large enough to justify the large investment necessary for economical production of pig-iron, provided that the coke problem can be solved.

Coke for metallurgical purposes must satisfy certain chemical and physical requirements. The principal chemical requirements are that it should contain little of either sulphur or phosphorus. Physically, it should break into large pieces of considerable crushing strength, so that the charge in the furnace may be supported properly. Given the chemical analysis of a coal or a mixture of coals, analysis of the coke to be produced can be predicted closely. On the other hand, while experience furnishes some guide as to the physical characteristics that will be obtained, trial alone will show definitely whether the product will actually 'coke'.

The lignites of California and the adjacent States are not suitable for making metallurgical coke. The only coal thus far found in California that is suitable for coke making is that mined at Stone Canyon, Monterey county. By mixing the Stone Canyon coal with equal proportions of Sunnyside coal from Utah, a good coke has been produced. The Stone Canyon mine has not been operated for several years, and the railroad from the mine to the main coast line of the Southern Pacific has been put out of commission by storms, but it could be repaired at no great expense. A considerable change in the old mining methods would have to be made before the coal could be produced economically. In Washington the Black Diamond coal will make a good coke without any mixture. Some of the Alaskan coals are good coking coals.

Charcoal was the original fuel used in the iron industry, long before coke was even discovered. It is used in Sweden now, usually in connection with the electric furnace, because coke is not available. It is also used in the United States for the production of special grades of iron, for which its freedom from sulphur makes it preferable to coke. The waste wood and sawdust, particularly the latter, from sawmill operations would furnish cheap raw materials for producing charcoal on the Pacific Coast. A certain inventor claims that he can produce a 'coke' suitable for metallurgical purposes from sawdust.

The electric furnace in the United States has generally been used for producing steel and ferro-alloys, but in Sweden large quantities of pig-iron are produced in that way, direct from the ore. Whereas it takes about a ton of coke to make a ton of pig-iron in the blast-furnace, 800 lb. of coke or charcoal is all that is required in the electric furnace. Electric furnaces in Canada have succeeded in reducing their current consumption to 500 kw-hr. per ton of iron. Assuming that the costs of production, outside of fuel and current, for the blast-furnace and the electric furnace are equal (a very rough approximation) 500 kw-hr. of electric energy would offset 1200 lb. of coke. With energy at 1c. per kilowatt-hour, this would correspond to coke at $8.33 per ton. There is also the better quality of the iron produced by the electric furnace to be considered.

The Noble Electric Steel Co. originally erected its furnaces at Heroult, California, with the idea of making steel, but soon abandoned that plan, and since then, has confined itself to the production of ferro-alloys. This is not necessarily an indication that the manufacture of iron and steel in the electric furnace is not commercially practicable on the Pacific Coast. It may be merely that the present unusual conditions make the manufacture of ferro-alloys more profitable. It should also be remembered that, at the time the Noble company was trying to make and sell electric steel, costs of manufacture at Eastern plants as well as freight rates were lower, and conditions were therefore not so favorable to the development of a Western industry.

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Inspection of Metallic Electrode Arc-Welds

By
O. S. ESCHOLZ

THE common belief that inspection furnishes no indication of the character of an electric weld is here shown to be erroneous. Mr. Escholz is research engineer for the Westinghouse Electric & Manufacturing Company.

THE lack of a satisfactory method of determining the character of welded joints, more than any other factor, has been responsible for the hesitancy on the part of the engineering profession toward the extensive adoption of arc-welding. It is desirable to shape our rapidly accumulating knowledge of operation into an acceptable method of inspection.

Manufactured apparatus is usually accepted on the basis of complying with a process-specification together with the successful reaction to certain tests applied to the finished product. Riveting seriously impairs the strength of the joined plates, yet with a proper layout and intelligent inspection, the completed structure possesses certain definite characteristics that do not require further verification. The inspector of a finished concrete structure is practically helpless. The weakest sort of construction may be concealed by a sound surface. With a careful supervision of the process, however, the physical properties of the completed structure can be reliably determined. Similarly, electric-arc welding is susceptible to even better control than either of these structural operations.

The four factors that determine the physical characteristics of metallic-electrode arc-welds are: fusion, slag-content, porosity, and crystal structure. Some of the methods that have been suggested and used for indicating these characteristics are:

First, examination of the weld by visual means to determine: (1) Finish of the surface as an index to workmanship. (2) Length of deposits, which indicates the frequency of breaking arc, and therefore, the ability to control the arc. (3) Uniformity of the deposits, as an indication of the faithfulness with which the filler metal is placed in position. (4) Fusion of the deposited metal to the bottom of the weld scrap as shown by the appearance of the under side of welded joint. (5) Predominance of surface porosity and slag.

Second, chipping the edges of the deposited layers with a cold chisel or calking tool to determine the relative adhesion of the deposit.

Third, penetration tests to indicate the linked unfused zones, slag pockets, and porosity by: (1) X-ray penetration. (2) Rate of gas penetration. (3) Rate of liquid penetration.

Fourth, electrical tests, showing variations, as a result of incomplete fusion, slag inclusions, and porosity: (1) Electrical conductivity. (2) Magnetic induction.

These tests if used to the best advantage would have to be applied to each layer of deposited metal as well as to the finished weld. This, except in unusual instances, would not be required by commercial practice.

Of the above methods, visual examination is of more importance than is generally admitted. Used in connection with the visual examination, the chipping and calking tests are of particular usefulness. The latter test serves to indicate gross neglect by the operator of the cardinal welding principles, because only a poor joint will respond to the tests.

The most reliable indication of the soundness of the weld is offered by the penetration tests. Obviously, unfused oxide surfaces, slag deposits, and blow-holes will show varying degrees of penetration. Excellent results in the testing of small samples are obtained by the use of the X-ray. However, due to the nature of the apparatus, the amount of time required and the difficulty of manipulating and interpreting results, it has not become practical for large-scale production.

Determination of the rate at which hydrogen or air leaks through a joint from pressure above atmospheric to atmospheric, or from atmospheric to partial vacuum, requires cumbersome equipment, and presents few advantages over the liquid-penetration method.

Kerosene, of the various liquids that may be applied, has marked advantages, because of its availability, low volatility, and high surface-tension. Due to the latter characteristics, kerosene sprayed on a weld surface is drawn rapidly into any capillaries produced by incomplete fusion between the deposited metal and the weld scarf, or between succeeding deposits, slag inclusions, or gas-pockets. It penetrates the weld and shows the existence of an unsatisfactory structure by a stain on the other side. A bright red stain can be produced by dissolving suitable dyes in the kerosene. Faults have been found by means of this test that could not be detected by hydraulic pressure or other methods. A sequence of imperfect structures linked through the weld, the greatest hazard in welded joints, can be detected readily. This method is not applicable to the detection of isolated slag or gas-pockets, nor of small disconnected unfused areas. Various tests have shown, however, that a weld may contain a considerable amount of distributed small imperfections, without seriously affecting its usefulness.

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If a bad fault is found by the kerosene test the metal should be burned out with a carbon arc before re-welding under proper supervision. The sand blast, steam, or gasoline will remove the kerosene. No difficulty, however, has been found in welding over a thin film of the liquid.

Electrical methods by which the homogeneity of welds are determined, are still in the evolutionary stages. Difficulties are yet to be overcome before the electrical test is feasible. Some of the difficulties are the elimination of the effect of contact differences, the influence of neighboring paths and fields, and the lack of practicable portable instruments sufficiently sensitive to detect slight variations in conductivity or magnetic-field intensity.

In common with all other operations, metallic electrode-arc welding is readily susceptible to analysis. Regardless of the metal welded with the arc, the cardinal steps are: (1) Preparation of weld. (2) Electrode selection. (3) Arc-current adjustment. (4) Arc-length maintenance. (5) Heat treatment.

Sufficient scarfing is included with the preparation of the weld, as well as the separation of the weld slants, so that the entire surface may be accessible to the operator with a minimum amount of filling required. When necessary to avoid distortion and internal stresses due to unequal expansion and contraction strains, the metal is pre-heated or placed so as to permit the necessary movement to occur. Various types of scarfs in common use are shown in Fig. 1.

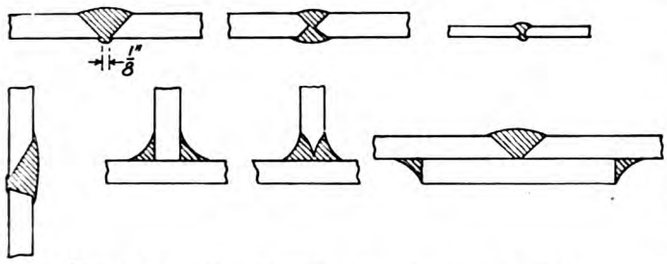

FIG. 1. COMMON TYPES OF ARC-WELD SCARFS.

The electrode selection is determined by the mass, thickness, and the constitution of the material to be welded. An electrode free from impurities and containing about 17% carbon and 5% manganese, has been found satisfactory for welding low and high carbon, as well as alloy steels. This electrode can also be used for cast-iron and malleable-iron welding, although more dependable results, having greater consistence and permitting machining of welded sections, can be obtained by brazing, using a copper-aluminum-iron alloy electrode with the aid of some simple flux. Satisfactory results are obtained from brazing copper and brass with this electrode. The diameter of the electrode should be chosen with reference to the arc current used.

Many concerns have attempted welding with too low an arc current and the result has been a poorly fused deposit. This is due largely to the overheating characteristic of most electrode holders, leading the operator to conclude that the current used is in excess of the amount needed. The approximate values of arc current to be used for given thickness of mild steel plate, as well as the electrode diameter for a given arc current may be taken from the curve in Fig. 2.

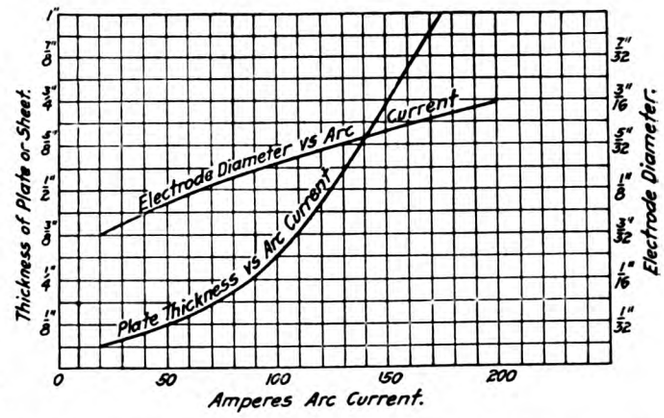

FIG. 2. CHART SHOWING APPROXIMATE ARC-CURRENT AND ELECTRODE DIAMETERS FOR WELDING STEEL PLATE OF VARIOUS THICKNESSES.

Notwithstanding that electrode development is still in its infancy, the electrodes available are giving satisfactory results. However, considerable improvement can yet be made in the ductility of welds, consistence of results, as well as in the ease of using the process. Maintenance of a short arc-length is imperative. A short arc is usually maintained by a skilful operator, as the work is thereby expedited, less electrode material wasted, and a better weld obtained, due to improved fusion, decreased slag content, and porosity. By observing the arc current and arc voltage from meter deflection or from recording instruments the inspector has a continual record of the most important factors that effect weld strength, ductility, fusion, and porosity. A fixed series resistance and an automatic time-lag re-set switch across the arc will fix definitely both the arc current and the arc voltage, thus placing these important factors beyond the control of the welder and under the direction of the supervisor.

The method of placing the deposited layers affects the internal strains and distortion obtained on contraction. It is possible that part of these strains could be relieved by pre-heating and annealing, as well as by the allowance made in preparation for the movement of the metal. Heat treatment of a completed weld is not necessary, particularly if it has been pre-heated for preparation and then subjected to partial annealing. A uniform annealing of the structure is desirable, even in the welding of the small sections of alloy and high-carbon steels, if it is to be machined or subjected to heavy vibratory stresses. The inspector, in addition to applying the above tests to the completed joint and effectively supervising the process, can readily assure himself of the competency of any operator by the submission of sample welds to ductility and tensile tests or by simply observing the surface exposed on cutting through the fused zone, grinding its face, and etching with a solution of 1 part concentrated nitric acid in 10 parts water.

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The American Merchant Marine After the War

By ROBERT DOLLAR

THE question that is troubling all thinking men today is: How are we going to operate our ships after the War? In normal times our present laws and regulations make this financially impracticable, and we must not get carried away with the present abnormal conditions and rates of freight, which make it possible for anyone to make a profit, no matter how inexperienced. The statements in this article are based on normal conditions which are sure to come after the War.

From 1795 to 1820, during which time preferential duties were in force, at least 90% of American exported goods were carried in American ships. From that time the proportion began to decrease until, in 1914 just before the War, only 0.97% of American goods were so carried. Again in 1913, before the Seamen's Bill went into effect, about 26% of the Pacific trade was handled in Japanese ships and 26% in American ships. In May 1917, the proportion of Japanese vessels had grown to 51%, while the American vessels had fallen to 2%.

The following statement is taken from our books regarding wages on three steamers that we were operating in 1914. Their indicated horse-power was exactly the same and the tonnage was nearly the same:

	Per month
American steamer, 47 men	$3720
British steamer, 36 men	1308
Japanese steamer, 36 men	777

On the Pacific the keen competition that Americans have to meet is from the Japanese. After the War this competition will also be felt on the Atlantic. The Japanese ship-owners have made enormous profits during the War; therefore that competition will in future be backed by plenty of money, by having subsidies for shipbuilding and for carrying the mails, and by other advantages that the American ship-owner must combat. There is some talk of our Government chartering its ships to individuals after the War and not selling them. This will be a fatal mistake. The men who in the past developed American and British foreign trade were ship-owners. Ship-charterers having no money invested will operate ships only as long as they can make a profit. Responsible ship-owners will continue business even at a loss, and wait until times get better; thereby maintaining the foreign trade of our country.

At a banquet in Philadelphia the Secretary of the Navy announced the contemplated extension of Government ownership, to own and operate all American ships and to engage in foreign trade; thereby destroying the private ownership of ships and going into competition against our merchants in the foreign trade. (Our Government has already started to trade commercially, I understand, in Siberia.) The result of this policy would be to destroy the initiative of our merchants in the foreign trade and the few ship-owners that we have left; and this when we are on the eve of the keenest competition the world has ever seen. In addition to all this, we are told that the rates of freight would be lower than those of our foreign competitors. (They will have something to say about this.)

I suggest that, instead of Government ownership, the ships should be sold at prices to meet competition and on reasonable terms of payment, to encourage the ownership of ships by men of moderate means. For example, the Government ships should be sold at the current price of similar ships prevailing in London, one-quarter cash, and one-quarter in one, two, and three years, with interest at 4%, and when the various payments fall due the amount to be paid shall be the price prevailing then in London, thereby putting our ship-owner on an exact equality with our foreign competitors as to the first cost of the ship. In other words, keeping the cost of the ships so bought equal to foreign ships while the owner is paying for them. The difference between cost to the Government and selling price to be charged to the cost of the War, the same as ammunition.

Instead of Government ownership, the ships should be sold at prices to meet competition and on reasonable terms of payment.

WAGES. As explained, the wages of the crew are an important matter. As the American cannot be leveled down to meet foreign competition, and the foreigner cannot be raised to the American standard, the American will, in consequence, leave the sea unless he gets about the same wages as he could get on shore. I offer as a solution of this condition that ship-owners hire their crews at full American wages, but that the difference between this wage and what is paid by Japanese competitors be paid by the Government to ship-owners on proper certification by the shipping commissioners of the amounts so paid.

Let ship-owners hire their crews at full American wages and let the difference between this and what is paid by Japanese competitors be paid by the Government to ship-owners upon proper certification by the shipping commissioner.

Example:

If the wages of the American seaman are	$60 per month
Japanese seamen	15 per month
Then the Government pays	$45 per month

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thus enabling American labor to receive its full wage and permitting the American ship to compete with the lower paid foreign crews. This is no subsidy to ship-owners, but only an equalization of American and foreign labor.

To those who are not familiar with the custom, I would explain that when a man hires to work on a ship he must go before the U. S. commissioner and sign the Articles or Contract, which are explained to the man by the commissioner. Then, when the voyage is ended, the ship-owner does not pay the crew direct, but takes the money to the commissioner, and he pays the men. By this arrangement the men would receive the full American wage, and such fine young Americans as are being trained in great numbers now would continue to follow the sea. The licensing of our officers must also be modified to be the same as our competitors.

In ships running to the tropics, Americans will not stand the work in the hot fire-room, and in that trade Americans are not likely to work in the steward's department. All American owners have had this experience. American sailors on deck, however, would get on all right. Outside of the payment by the Government to equalize the wages of the men and the proper payment for service rendered in carrying the mail, I claim that to maintain our American ships on the ocean no Government financial assistance is required. But our laws and regulations must be radically changed, not in a way to give our ship-owners any advantage over their competitors, but to put our ships on an equality with those of all other nations. To do this it will not cost our country a cent, except to equalize wages. The following are some of the changes in our laws that are necessary:

Take the measurement of the standard steamer of 8800 tons, deadweight. The steamer 'Robert Dollar', of which all those ships are duplicates, according to British measurement, was net 3420 tons. American ships of this tonnage run an average of net 4283 tons, a difference of 863 tons.* Since all port charges, pilotage, dry-docking, etc., are charged on the net tonnage, the American ship in foreign trade pays 25% more than the ships of any other nation, and since this is paid in foreign ports and to foreign nations, is it not up to Congress to tell us why our ships are thus penalized?

In an address General Goethals delivered in San Francisco he told of two sister-ships, one under the British flag and the other under the American flag. The latter paid $500 more tolls at Panama than the British vessel. In this connection it might be pertinent to ask why an American ship carrying a cargo of lumber pays more tolls than a ship carrying merchandise, coal, or iron.

Under American regulations regarding the yearly inspection the ship must be free of cargo, the boilers are filled with cold water. All handling of cargo is suspended and the inspection must be completed before work is resumed. On British ships no work stops. One part of the inspection is done, then when another part of the hull, boilers, or engines is ready, that is inspected. If the inspection cannot be completed, the vessel is allowed to proceed to the next port where it can be finished. The instructions are, not to stop the ordinary work of handling the cargo. In the successful operation of ships, one of the most important factors is the quick dispatch of ships in port.

The American rules require a cold-water hydrostatic pressure, once and a half the working pressure, to be applied to the boilers once a year, which racks the boilers and pipes, causes much expense, and shortens the life of the boilers. This is not required annually by any other nation. The American rules require a fusible plug in each boiler. No other nations have them. The loss of time and expense on American ships is considerable. More inspectors should be employed and the regulations changed to enable our ships to gain much valuable time.

The Secretary of Commerce, under whose jurisdiction this comes, has said that Americans are able and can do more and better work than any others and fully pay their employers for their higher wages and better board. If that is the case, why is it that on a 10,000-ton deadweight American steamer it takes 30% more men in the engine-room crew than on a similar sized steamer of any other nation? The British require two licensed engineers, the American four; and in addition to this, the American requires three oilers and three water-tenders. Ordinarily on foreign ships the storekeeper, donkeyman, and a greaser do the work of the oilers and no water-tenders are carried.

The Seaman's Bill provides that 65% of the crew, exclusive of officers and apprentices, shall be certificated able seamen. This part of the law was so impossible and unreasonable because such men could not be obtained that no notice has been taken of it during wartime. When peace comes, however, it will be enforced, thereby tying up half of our new merchant marine.

The law also provides that the Collector of Customs may, on his own motion, and shall upon the sworn information of any reputable citizen deny clearance and hold the ship until an investigation is made. So any water-front sorehead can hold up any ship. This provision is so drastic and vicious that it also has not been enforced; but it is the law, nevertheless.

Another clause provides that the seaman can demand and receive half of the wages he has earned (note the word 'earned', not due as it should be) at every port the ship goes to, and every five days he can make another demand. The police records of various ports where American ships have gone, especially Shanghai, Kobe, and Yokohama, bear ample proof that this is a bad law. The intention of this clause was to allow the men to draw their wages and desert; but it did not work that way, although it causes serious delay to the ship at almost every port. This provision must be repealed.

Another clause provides that the sailers shall be divided into two watches. On many ships a big crew is carried and enough men to navigate the ship are put on

*The laws of Great Britain and ours, as to measurement, are about the same, but the application makes this difference. The actual difference is as stated.

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watch-and-watch. The remainder of the crew sleeps all night and works in the daytime, the object being to get the day crew to keep the ship in good condition. If this section was enforced we would have to keep a smaller crew and let the maintenance of the ship go, as men cannot do any work at night except what is necessary to navigate the ship.

The clauses in the bill providing for greater safety of life at sea and having better accommodations for the crew should be retained (except the absurdities relating to davits and lifeboats on cargo vessels, which have never been enforced), but the American ships built recently have excellent accommodations and leave nothing to be desired, and the food served to American crews is much better than those of any other nation; in fact, it is as good as I have at my home.

The President has said that if American ship-owners could not operate ships the Government would operate them. This statement is on a par with tying our hands securely behind our backs and putting us in the prize-ring against an opponent with both hands free and backed by his Government. American citizens before the War were successfully operating two and one-half million tons of ships under foreign flags. Those same men would be only too glad to operate them under the Stars and Stripes if our laws and regulations would permit them.

American ship-owners would be glad to operate their ships under the Stars and Stripes if our laws and regulations would permit them.

More foreign trade is conceded to be a necessity after the War; therefore it is well to remind the people of these United States that our foreign trade is so linked with our merchant marine that they cannot be separated. This is also true of our manufacturing plants, banks, merchants, and farmers. The ramifications of this subject are so great that directly or indirectly they affect every American citizen. Therefore the time has come to demand the necessary legislation and regulation to put the operation of our ships on an equality with our competitors.

Note. This article is an abstract of a statement recently issued by Captain Dollar after consultation with the other prominent ship-owners of the United States.

THAT's an engine boiler," the foreman told the young lady visiting the locomotive works.

"And why do they boil engines?" she inquired.

"To make the engine tender," said the foreman.—'Boston Transcript.'

SAY, Ikey, Why does your fadder always stay behind the counter?

Because he is saving.

Vel, How does he do it?

He doesn't wear any pants.

Government Bureau Formed to Assist Trade with Russia and Siberia

The War Trade Board of the United States-Russian Bureau, Incorporated, is a company that has been organized by the War Trade Board at the direction of the President for the purpose of helping the Russians to help themselves in stabilizing the economic situation in Russia. It has a capital stock of $5,000,000, all of which has been issued and fully paid in cash out of Government funds. The stock is owned in its entirety by the U. S. government.

The company will engage in the business of exporting to Russia and Siberia agricultural implements, shoes, clothing, and other commodities which the Russian population need, bringing back Russian and Siberian raw materials in return. The company is intended to aid in supplying the needs of the people of Russia, in encouraging Russian production and trade, and to assist in the marketing of Russian products in America and their exchange for American goods. One of the chief objects which the company will have in view will be the encouragement of private capital to engage in trade in Russia and Siberia, as shipping becomes available for the purpose. Its policy will be to co-operate with, encourage, and promote such trade with Russia as will assist in the rehabilitation of her economic life, and to cover by its direct operations only such portions of the field as cannot at present be served readily by private enterprise.

The company has already begun the transaction of business by the dispatch of three vessels from the Pacific coast to Vladivostok carrying commodities that its representative in Siberia has designated as being most urgently needed there. By addressing the Russian bureau, persons interested in Russian trade may receive more detailed information as to the commodities most needed by Russia and the commodities likely to be available for export from Russia. Additional vessels will from time to time be scheduled, and shippers are urged to file applications for licenses to export to Russia such commodities as they know to be needed.

The head office of the Russian bureau is in the War Trade Board building at Washington, D. C. The board of directors of the company consists of the members of the War Trade Board. Vance C. McCormick, chairman of the War Trade Board, is president of the company, John Foster Dulles is secretary and treasurer, Henry B. Van Sinderen is acting manager. The directors are Vance C. McCormick, Thomas L. Chadbourne, Jr., Edwin F. Gay, Albert Strauss, Alonzo E. Taylor, J. Beaver White, and Clarence M. Woolley.

ONE of the San Francisco clubs celebrated 'British Day' with an address on 'Ireland's Part in the War.'

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The Wooden Ship: Its Defects and Its Virtues

By
AN OCCASIONAL CONTRIBUTOR

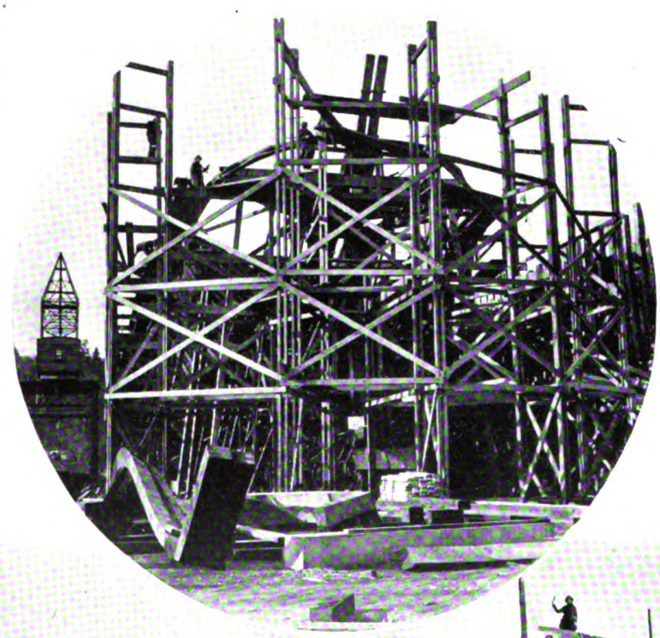
"WHAT is the latest scandal about wooden ships today?" is the way a reporter for a morning paper greeted one of the officials of the Shipping Board a few days ago. Accidents to the wooden ships and preferably anything scandalous have sufficient news value to interest this powerful daily but probably nothing else. This situation makes us pause and ask ourselves whether the wooden ships are as black as they have been painted in recent reports.

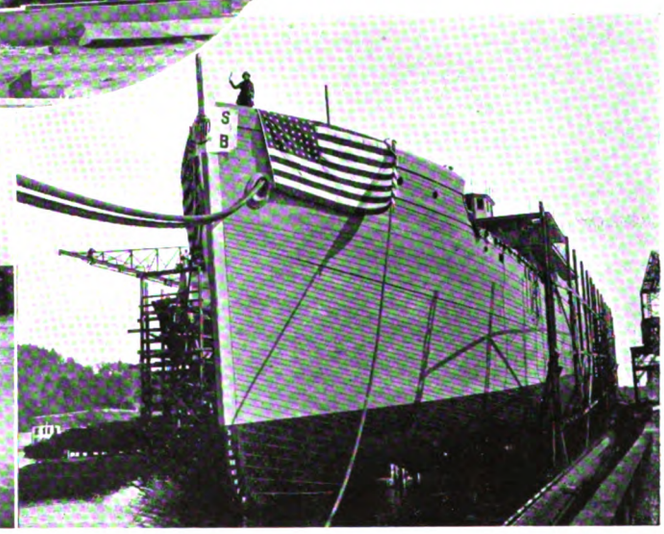
A wooden ship arrived in San Francisco a few days ago, having completed a round trip to Australia. The return cargo was wheat. An opportunity to visit the ship being afforded, the best part of the morning was devoted to an inspection. The captain told of his difficulties. The oil-tanks were not secured well and the pipe connections leaked badly. Therefore the insurance underwriters would not insure grain stored below the oil-tank and he had to take other kinds of cargo in that space. The ship had to be calked in Sydney. Otherwise she did very well.

On the way to see the chief engineer, the captain volunteered the remark that the engines worked splendidly. These were Diesel engines, 'Made in America', which had just completed a non-stop run from Sydney to San Francisco; 46 days, Sydney to San Francisco; and 10 days, Honolulu to San Francisco, driving the ship along at an average speed of nine and a half knots in ordinary weather. The main engines had done well, but some alterations had to be made in the auxiliary plant at Sydney.

The grain came out of the hold in perfect condition. The old timers used to pay a premium to iron ships for carrying grain, when wooden ships were in their day and they advised the present generation against wooden ships. They had in mind the mould, to which the old long voyages around Cape Horn subjected the cargo, but the conditions are different now with short voyages of six weeks at the most, and bilge-pumps worked by power other than the muscles of the crew.

In San Francisco harbor there are about a dozen new wooden ships in various stages of disrepute. In





VIEWS TAKEN AT THE SANDERSON & PORTER YARD AT RAYMOND, WASHINGTON. ALL THE SHIPS COMPLETED AT THIS YARD HAVE PROVED ENTIRELY SATISFACTORY

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Honolulu there are as many or more. On Puget Sound idly swings at anchorage a fleet, representing the efforts in Government ownership of the carrying trade at sea. Built for war purposes, the ships find but little welcome from the operating companies to which they have been assigned. They are steamers, and worse than that are coal-burners. Now, no one on the Pacific wants a coal-burner, be he operator or sailor-man. It was demonstrated years ago that oil makes a tremendous saving, and besides shoveling coal is not a popular job with the engine-room crew.

Some of the ships have been poorly built and the design of all of them has not been what it should be, nevertheless there are many honest-built wooden ships, which, when various defects are corrected, will carry cargoes across many thousands of miles of the sea before their period of usefulness is ended. Initially, as all experienced seamen knew, the calking of the seams would require attention for the first six months at least. As the ships were largely built of green lumber, it was expected that this would shrink. As the ships get older this will be corrected automatically. Ultimately there will be no trouble from this source.

The wooden ships are equipped with steam propelling-machinery because, under war-conditions, no other kind was available. It would probably be a mistake to complete the steam-engines now building and put them in the ships under construction. American manufacturers now can furnish internal-combustion engines. Equipped with such power the wooden ship can hold its own against any steamer however manned. For years the only real competitor it will recognize is the large steel Diesel-motored ship, which by virtue of its large size and cheaply maintained steel hull can carry cargo cheaper than any other ship. For the size suited to the wooden ships the Diesel engines should go to the wooden ships and the steam-engines to the larger steel ones. Later when the manufacturers get into their stride they can attempt the larger Diesel engine for the 10,000-ton freight-carriers.

Now in its darkest day, the wooden ship will disappear from the news columns. Only in the technical press will its performances be recorded. Here may the wise man, who is careful of the authenticity of his information, read of voyages completed at a profit and of the triumphs of American makers of the new oil engines.

EVERY sign of these terrible days of war and revolutionary change, when economic and social forces are being released upon the world whose effect no political seer dare venture to conjecture, bids us search our hearts through and through and make them ready for the birth of a new day—a day, we hope and believe, of greater opportunity and greater prosperity for the average mass of struggling men and women, and of greater safety and opportunity for children.—President Woodrow Wilson.

Electric-Arc Welding

By EDWARD W. HALL*

The process of arc welding was invented over 20 years ago, but its general use is comparatively recent. The development of the past year or so has been in part the result of the normal progress of the art, but has been caused mainly by its application to ship construction by the Emergency Fleet Corporation. The need for rapid production of ships has required the use of every possible method for facilitating construction.

The various methods of welding were investigated by a committee 'lent' to the Emergency Fleet Corporation by the U. S. Bureau of Standards. This committee found that arc welding could be used to reduce the cost and accelerate the construction of steel ships, and also that successful arc welding required an exceptional type of workman. One of the principal requirements is that he shall have an unusual amount of conscience, in other words, that he shall not be afraid to tell his foreman when he has made a poor weld. The difficulty of determining the soundness of a weld except by testing it to destruction makes it possible for an unconscientious man to cover up poor workmanship and 'get away with it'. The test to destruction might then come after the work was completed, with disastrous results. When this happened, welding was given a 'black eye', recovery from which was difficult.

The committee discovered among other things that alternating current could be used in 'bare-wire' welding. Formerly it was believed that this could be done only with a covered or else a slag-coated electrode, and much ridicule was cast upon Mr. Holslag, the inventor. However, he persevered, and has perfected apparatus with which alternating current can be used for 'bare-wire' welding.

Under the direction of Mr. Horner, of the Education and Training Section of the Emergency Fleet Corporation, courses in electric welding have been established in the San Francisco district. Classes of 20 men are instructed at one time. The courses last from 6 to 8 weeks. The graduates are rated in four general classes. Class A includes the men who are fairly good welders in special lines. Class B includes specialists of unusual skill. Class C includes the all-round welders, and class D comprises the men of proved exceptional ability in all departments of electric-arc welding. Opportunity is given to the men to study chemistry, particularly electro-chemistry, metallurgy, and astronomy, as it has been found that a knowledge of these subjects increases a welder's efficiency. Courses in these subjects are required before a man is rated as a class D welder.

"I AM tired of being a goat."
"Then why don't you stop butting in?"

*Engineer, U. S. Shipping Board.

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Recent Labor Disputes in the San Francisco Bay District

AMONG recent labor troubles the most serious was caused by the strike for a 44-hour week by Boiler Makers Union No. 233 of Oakland. This union, although it is affiliated with the Iron Trades Council of San Francisco, and also with District Council No. 44, Boiler Makers of the Pacific Coast, has consistently, since its organization, taken labor matters into its own hands, opposed the conditions and terms of the Macy Board, and disregarded the action of the Iron Trades Council. There have been considerable turmoil and numerous strikes on the part of Union No. 233 whereas there has been practically no trouble with San Francisco Union No. 6, whose men have worked continuously during the entire period.

Agreements do not Provide for Half-Holiday

The decision of the Macy Board rendered December 4, 1917, specifies in two places that "double time shall be paid for work on holidays and on Saturday afternoons in June, July, and August." The agreement of January 2, 1918, of the California Metal Trades Association and the California Foundrymen's Association with the Iron Trades Council makes a similar provision. At no time has there been any understanding or agreement on the part of the U. S. Shipbuilding Labor Adjustment Board (the Macy Board), the California Metal Trades Association, the Iron Trades Council, or the owners or officials of shipyards, to the effect that the Saturday half-holiday should continue after Saturday, August 31, 1918. In accordance with the agreement, all the men employed in the San Francisco Bay district who were members of any union affiliated with the Iron Trades Council, worked eight hours each Saturday beginning September 7, 1918, and, with the exception of Boiler Makers Union No. 233, have continued to do so without question.

Boiler Makers Union No. 233 of Oakland is the only organization in the San Francisco Bay district connected with the Iron Trade Council that has arbitrarily and in violation of all agreements and decisions, refused to work Saturday afternoons. In justification of this action, statements have been made that the agreements expired August 1. On the contrary, the agreement between the California Metal Trades Association and the Iron Trade Council is to be in effect for the duration of the War and the Macy award holds until the Macy Board is dissolved or makes a new decision, changing the provisions of the old one. In section 23 of the Macy decision of October 1, 1918, regarding wages, hours, and other conditions, it is stated that working hours, etc., are to continue as provided in previous decisions. In case of dispute as to what these conditions were, the standard is to be the custom observed in the district during the corresponding month of the preceding year.

Failing to secure authorization of their actions from any of the responsible parties involved, the members of Union No. 233 continued to take the 44-hour week. In order to obtain what might appear to be a recognition of their contention, they requested that the shipyards pay off Saturday noon. This was refused by all the yards, which had been paying at the regular hour of 4:40 p.m. Saturday. The men then requested that the yards pay Friday evening. This request was granted, but without recognizing the 44-hour week. That week the Moore Shipbuilding Co. paid on Friday night and the Union Construction Co. paid at its regular time, namely, Friday noon. The Alameda plant of the Bethlehem Shipbuilding Corporation was paying some of the crafts on Wednesday, some on Thursday, and some on Friday night, and the boiler-makers on Saturday night. This company agreed to change the pay-hour of the boiler-makers to Friday night to conform with the practice of the Moore Shipbuilding Co. but did not recognize the 44-hour week. On account of the great number of men involved, the Bethlehem company was unable to change its pay-day in so short a time but would have paid the following Friday night, and so stated to the men.

Another demand by the business agent of Union No. 23 was that the night shift be allowed to work 44 hours per week. The Bethlehem Alameda yard, because of the unsatisfactory production and the added expense, was obliged to discontinue the night shift for Saturday night, which had been working only four hours. The Union also demanded that the business agent be admitted to the yard without restriction. This was directly contrary to the decision of the Macy Board and the California Metal Trades Association-Iron Trades Council agreement, which provides that the admission of business agents shall be at the discretion of the management.

Boiler-makers Strike Without Authority

On the following Monday, the boiler-makers at the Bethlehem Alameda plant struck without the formality of requesting authorization from either the Iron Trades Council or from their International. After the strike had been called, the officials of the Bethlehem plant and the local representatives of the Labor Adjustment Board declined to confer with the men until they had returned to work, so the strike continued for two weeks. The men appealed to H. C. Capwell, president of the Oakland Chamber of Commerce, to arbitrate the question. After several meetings with the Bethelehem officials, Federal Examiner Brotherton, and A. F. Pills-

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bury of the Emergency Fleet Corporation, Mr. Capwell secured a letter from A. S. Gunn of the Bethlehem Shipbuilding Corporation to the effect that the matter was entirely in the hands of Mr. Brotherton and that any decision made by him would be satisfactory to the Bethlehem Shipbuilding Corporation. Mr. Brotherton wrote to Mr. Capwell stating that he believed all matters would be satisfactorily adjusted, provided the men returned to work, that he would give the matter his immediate attention, and that he believed the conditions existing in other plants in Oakland would be observed by the Bethlehem Alameda plant. Thereupon the men returned to work with no further promises from either the Bethlehem company or from Mr. Brotherton except those stated above.

Decision of Federal Examiner

On December 12, 1918, Mr. Brotherton rendered a decision in writing in which the vital points at issue were covered as follows: Referring to the decisions of the Shipbuilding Labor Adjustment Board, he stated: "There can, therefore, be no change in regard to the basic eight-hour day on Saturday, except in June, July, and August." In regard to working night shift, Mr. Brotherton recommended that "to the best interest of all concerned, uniform conditions should prevail in all shipbuilding plants on the east side of the Bay as nearly as possible, and my recommendation is that your Alameda plant follow the same practice that has been followed by the Moore Shipbuilding Co. in permitting the night shifts to work Saturday at the usual time. This does not in any way establish the Saturday half-holiday or the 44-hour week, but in fact, is just the contrary and if the men refuse to work more than four hours on Saturday they violate their agreement in so doing." In the matter of admission of the Union business agent to the yard, Mr. Brotherton stated that the Board had no jurisdiction but that the ruling of Charles Piez, vice-president of the Emergency Fleet Corporation, was that it should be left entirely to the discretion of the plant management. The Iron Trades Council had previously demanded from Union No. 233 that the men should return to work within a specified time, as the strike was in violation of the Council's agreement with the California Metal Trades Association. The Union thereupon wit' drew from the Iron Trades Council, and was later ex pelled for not complying with the Council's demands.

Larorer's Union Demands Saturday Half-Holiday

On December 9 the Shipyard and Metal Trade Laborers Union Local No. 15,430 of Oakland served notice on a number of members of the California Metal Trades Association that, beginning December 14, the men would take Saturday afternoon off and that any members required to work Saturday afternoons must receive double time. This organization is affiliated with the Iron Trades Council and therefore the matter was called to the attention of the Council by the Metal Trades Association with the statement that such action, if taken, would be in violation of their agreement. The Iron Trades Council was requested to take steps to prevent the action of the Laborers Union.

The Laborers Union refused to work Saturday afternoon, December 14, at the Oakland and Alameda shipyards and at the plants of the Judson Manufacturing Co., C. L. Best Gas Traction Co., and Standard Gas Engine Co. On Monday, December 16, a letter was directed to the Iron Trades Council again calling attention to the violation of the agreement. The Council then ordered the laborers to work Saturday afternoon in accordance with the agreement with the California Metal Trades Association.

In the meantime, the Standard Gas Engine Co. had refused to employ 12 laborers, who had quit Saturday afternoon, when they returned to work Monday morning. This action was referred by the business agents of the Machinists' Union and the Shipyards Laborers' Union to the California Metal Trades Association, requesting that these men be taken back pending the action of the Shipyard Laborers' Union regarding the order of the Iron Trades Council. The business agent of the Laborers Union claimed that the act of the Standard Gas Engine Co. constituted a lock-out. The Metal Trades Association recognized the justice of this claim, and requested that the men be re-employed and that no independent action be taken by any individual firm until sufficient time had elapsed to enable the Iron Trades Council to enforce its rulings. The Standard Gas Engine Co. complied with the request and the men were taken back. The success of collective bargaining depends on the elimination of individual action on the part of both the unions and the employing firms. In this particular case, had both parties referred their grievances to their respective organizations, there would have been no trouble. That the dispute was settled so satisfactorily is a testimonial to the effectiveness of the collective bargaining agreement.

Strike of Pipe-fitters Employed by George Anderson

On December 16 about 30 pipe-fitters employed by George Anderson, 240 Steuart street, refused to work unless they were paid the new Macy scale. This matter was referred to the Iron Trades Council by the California Metal Trades Association. The men were ordered back to work as they had struck without authority.

Strike of Machinists at Mann Manufacturing Co. Plant

During the early part of December, 40 machinists employed by the Mann Manufacturing Co. struck because a specialist was put on a big milling machine. The men claimed that this was machinist's work. The custom in this shop had been to use boys on milling machines on repetitive work but, for special jobs, the work would be given to a machinist. On December 9, a young man was hired that had been employed for some time by one of the company's competitors, and who had been doing the same kind of work. He was a little older than the boy that had been working on the machine. The shop

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committee thereupon objected and sent for the business agent. The stand was taken that the company had no right to put any one on that machine except a machinist or an apprentice. The men claimed that a change had been made in existing conditions without a conference, as the company had formerly employed machinists or apprentices for that work. The principal claim was that the milling machine must be operated by a machinist or else that the operator must be paid machinist's wages, regardless of experience or training or of the character of work being performed. The company maintained that the boys that had worked on this machine were not apprentices and that no change was made by hiring a specialist.

On Wednesday noon the men went on strike. The matter was referred by the California Metal Trades Association to the Iron Trades Council in accordance with the agreement. The claim was made that the strike was in violation of the clause of the agreement providing that "During the life of this agreement, there shall be no strike on the part of employees or lock-out on the part of the employer." On December 16 no reply had been received from the Iron Trades Council and the men were still on strike. The Association then sent another letter to the Council, calling attention to the letter of December 12 and stating that it had received no reply, that the men were still out. The Iron Trades Council met that night and recognizing that the men had struck in violation of the agreement, reprimanded them and ordered them to return to work, which they did the following day.

Engineers Service Bureau Established at San Francisco

The Joint Council of the Engineering Societies of San Francisco, which represents the local sections of the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Institute of Mining Engineers, and American Chemical Society, has established an 'Engineers' Service Bureau', with headquarters at the Engineers' Club. This is intended to provide a clearing-house through which engineers in search of employment may get in touch with prospective employers and through which employers may find technical men promptly when they are needed.

The Bureau is to be provided with as complete a list of engineering vacancies as it is possible to compile and to keep corrected. Blanks may be had at the office of the secretary of each of the five sections. Applications must be mailed to 'Service Bureau' Engineers' Club, 57 Post street, San Francisco. The Service Bureau will give information to applicants only by mail or telephone. As the matter cannot be handled otherwise, there will be no exceptions to this rule against receiving applicants in person.

Finding Work for Returned Soldiers to be Under Direction of U. S. Employment Service

With the co-operation of the national welfare organizations, the Government agencies interested in demobilization, and local community organizations of all kinds, the United States Employment Service is establishing a Bureau for Returning Soldiers, Sailors, and War Workers in every city and town in the United States. It also has stationed qualified representatives in all Army camps and posts in this country to acquaint soldiers with the facilities for assisting them to suitable employment after they leave camp.

The reconstruction program of the Employment Service co-ordinates national and local efforts, both governmental and private, and centralizes in every community, through these local bureaus, information as to proper openings in industry, commerce, and agriculture available to the Nation's fighters and war workers. It calls for assisting them to the best work the country can give them, the individual's qualifications being considered.

The program has been approved and adopted by the Secretaries of the War, Navy, Interior, Commerce, Agriculture, and Labor Departments, sitting as the members of the Council of National Defense. These cabinet officials have also taken steps to keep intact the field machinery of the defense council so that it may be utilized by the Department of Labor and its Employment Service in carrying out the different steps of the replacement program.

Employers are urged as a patriotic duty to register opportunities for employment at the central bureau, with specifications as to types and kinds of men wanted and other necessary details. They should inform the bureau when such positions are filled or when new jobs are open. The full resources of the bureau will be open without charge to any returning soldier or sailor, regardless of where he first makes application.

While designed primarily for soldiers and sailors, in many communities the bureau will care also for those civilians who have left their peace-time jobs to take positions with concerns engaged in doing war work. In many places the facilities of the Employment Service are sufficient in themselves to care for the civilian workers; in other places it may become a community necessity that the central bureau should look out for war workers as well as soldiers and sailors.

It should also be noted that a recent order of the War Department provides for the discharge of an enlisted man when he is urgently needed in an industry, provided that such discharge does not disrupt or cripple an existing organization and that the soldier's services are not required. Employers should, however, note that this order applies only to individual and exceptional cases, and is not intended to release men in large groups for any general employment.

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The Wastes of the West—III

By Miner Chipman

MANAGERS OF MEN

I SOMETIMES wonder if all of the organizing genius of the West has been concentrated in the trade-union movement. I am not prepared to say that such a condition would be counted as one of the 'Wastes of the West', but an equitable distribution of organizing ability would go far in the promotion of industrial peace and the industrial development of this territory. The trade-union manager attains his individual ambitions by collective service. He utilizes the collective forces of trade-unionism to secure to himself the laurels of success. He knows and understands the principles of organization. His personal ambitions may be uppermost, but he never forgets that success depends upon the principles of solidarity and mutuality and that these must form the foundation of his success. Examples of the qualities of successful leadership are abundantly provided in an examination of the union organization of San Francisco.

An equitable distribution of organizing ability would go far in the promotion of industrial peace and the industrial development of this territory.

The employer, on the other hand, seeks to match his individual and personal conceptions of management with the collective forces of the trade-union movement. He has been beaten at the outset. I am aware of his membership in an Employers' Association, and the collective bargaining between the association and the unions. But there is a vast difference between the collectivism of the unions and of the association of the employers. 'Putting one over' on another member of the union, or one union putting one over on another union is not as inviting an enterprise as putting one over on a fellow employer. If initiative and cleverness fail to accomplish results in dealing with the trade-union, the only available course is to make the best of it by beating a competitor with some manipulation or combination of forces. I have been told, and it is probably only a rumor, that members of an employers' association have entered into private and personal agreements with the unions, when they are supposedly operating under a collective-bargaining agreement between the unions and the association of which they were a member. Trade-union leaders are not slow to take advantage of such circumstances. Sabotaging the Employers' Association is good business.

The employer seeks to match his individual and personal conceptions of management with the collective forces of the trade-union movement.

The greatest 'Waste of the West' is due to the lack of solidarity and organization of the employers. Twenty-five years of experience should have taught the employers that individualism disguised as collectivism in an association cannot successfully compete with genuine collectivism in the trade-unions. Attacks have been made upon the unions in the name of 'Open Shop.' It was assumed that a closed union-shop condition was something imposed upon the employer by the trade-unions. The real fact was that the tendency toward closed-shop conditions was due to the superior organizing ability of the trade-union movement, and to the individualism of the employer. Closed union-shop conditions, like air, will flow in and fill a vacuum. Collective bargaining from the trade-union point of view is all inclusive. The union can make no exceptions. If the collective idea is good for a portion of the workmen it is better for all of them. Collective bargaining cannot be interpreted by the union to mean anything less than a 100% contract. The employers have accepted collective bargaining, but the agreement entered into by them has not always been collectively acceptable. Committees have been delegated power and responsibility without instruction concerning the principles and practical application of the bargaining power. To 'get an agreement' has been of first importance, and the 'character of agreement' has been left to the discretion of individuals.

The tendency toward closed-shop conditions is due to the superior organizing ability of the trade-union movement, and to the individualism of the employer.

Compare a contract to build a ship, a dock, a railroad, or an office-building, with the contracts entered into between employers and the trade-unions. The employer, when he buys anything other than labor, has a distinct understanding what he is going to get for his money. The employers enter into an agreement for what? Wages and time! Let us see what this means. Time is a unit of capacity for work. Eight hours represents a certain potential capacity for work. Within that period of time so much work can be performed. The worker is to be paid for the time and not for the work done. The housewife goes to her grocer to buy sugar. If she followed the methods of the employer she would say: "I want a ten-pound sugar-sack for which I will pay you one dollar." The grocer would take a paper sack which might hold ten pounds of sugar, toss in a quantity of the precious stuff, and pocket the dollar.

The employer, when he buys anything other than labor, has a distinct understanding of what he is going to get for his money.

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How much sugar would she receive? The sack is a unit of capacity. Was she buying capacity or sugar? If the grocer can put two pounds of sugar in the sack and get a dollar for it, he is a clever business man. If he succeeds, he will try and reduce the size of the sack, and save paper, and ask a dollar for the smaller package.

What is the employer buying? Time, or the product of labor? The object of the trade-union is to secure the greatest possible return for the product of labor. The most effective device for securing the maximum wages for the minimum effort is bargaining for time earnings. Don't attach any blame to the union; that is their business, and if they can get away with it, all the credit is due them for their business sagacity.

What is the result of this tendency? A decreased production, and an increased cost of manufacture. Habits of industry are created that menace the industrial prosperity of the community. The employer cannot pay something for nothing and succeed. It does not matter how small that something may be. His market is narrowed, his output curtailed, and his costs increased.

Earning something for nothing produces many surprising results. In increases the turn-over of labor. Men move from job to job seeking new bonanzas. Men take week-end vacations with punctual regularity because they can earn enough in four or five days to satisfy their every want. Boys leap to the top of the ladder of success at a single bound. Barbers become machinists overnight. J. Rufus Wallingford becomes a novice.

Our industrial wastes find their source in the kind and character of agreement entered into between the employer and the unions. There is little need of discussing organization, methods, and systems, when these devices are made ineffective by the inefficient ideals of the collective bargain.

Don't blame the union!

An organization of employers with the backbone necessary to force a collective bargain suitable to the needs of the business community is the first essential. This backbone will develop with proper leadership. The time has come when the making of a collective bargain between the business-men and the trade-unions of this city must be considered to be a great and serious undertaking. Principles must be established, and the unions must be made to know that these principles cannot be violated. The employers must stake out the maximum limits to which they will go. The day of little surrenders must pass. The collective-bargain agreement has come to stay. The agreement of the future will be one that will ensure the permanent prosperity of our business enterprise, and the security and contentment of the working people. Radicalism and syndicalism must be nipped in the bud. A collective bargain cannot be made with the I. W. W., nor with any union entertaining the philosophy of direct action, sabotage, and the confiscation of property. The national officials of the I. W. W. have been tried and convicted. They are in jail. Employers must look out, however, that men holding the same notions of social reform, men having the same radical philosophy of direct action, do not gain control of the trade-union movement. Collective bargaining must stop when the rational leadership of the trade-union movement is removed, and irresponsible social-reformers force themselves into positions of power.

The time has come when the making of a collective bargain between the business-men and the trade-unions of this city must be considered to be a great and serious undertaking.

It is again a question of Leadership, a problem of managing men.

American Steel Specifications for Latin America

The Bureau of Foreign and Domestic Commerce announces five more numbers of the Industrial Series, published in Spanish and English, as follows:

Standard Specifications for Carbon Steel Rails, Industrial Standards No. 2.

Standard Specifications for Medium-Carbon Steel Splice Bars, Industrial Standards No. 5.

Standard Specifications for High-Carbon Steel Splice Bars, Industrial Standards No. 6.

Standard Specifications for Structural Steel for Bridges, Industrial Standards No. 7.

Standard Specifications for Carbon Steel and Alloy Steel Forgings, Industrial Standards No. 11.

This series is being issued as the result of inquiries from Latin America for exact data on American specifications for structural materials, the inquiries arising from a desire to specify American materials. Publication of the pamphlets in Spanish and English has been made possible by the co-operation of the American Society for Testing Materials, the American Society of Civil Engineers, and the Bureau of Standards and Bureau of Foreign and Domestic Commerce, of the Department of Commerce. The text is that adopted by the American Society for Testing Materials.

THEY were engaged to be married, and called each other by their first names, Tom and Fanny. He was telling her how he had always liked the name of Fanny, and how it sounded like music in his ear.

"I like the name so much," he added, as a sort of clincher to the argument, "that when my sister Clara asked me to name her pet terrier, I at once called her Fanny—after you, dearest!"

"But I don't think that was very nice," said the fair girl, edging away from him. "How would you like to have a dog named after you."

"Why, that's nothing!" said Tom, airily, as he saw he'd made a mistake. "Half the cats in the country are named after me."—Detroit News.

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A Letter From the Front

THE BATTLE OF THE ST. MIHIEL OFFENSIVE

These past months seem like so many lifetimes, because they have been crowded with so many wonderful experiences, but the most wonderful of all is the one I am going to try and tell you about now.

Of course, you have read about our recent little show staged in what was the St. Mihiel salient. The papers, I am sure, have told that story and probably have given it many unnecessary high lights and used many lurid phrases of self-accredited glory when describing this little affair. So if you don't mind, I will confine myself to my personal experiences.

The official designation of that section of the General Staff known as 'operations', to which I am attached here at G. H. Q., naturally implies the planning of what commonly are referred to as 'battles'. But there is quite a distinction between a 'battle' and a military 'operation'; the latter is far more comprehensive in its scope.

Soon after undertaking my present job I, in the natural course of events, had to be informed of the proposed St. Mihiel operation, because I was required to work on the amazingly elaborate plans necessary to the success of such an undertaking. Little did I think, when I was struggling along with those damnable map-problems at the Staff College last winter, that I would so soon be called upon to apply the theory and practice to a situation in which I would be dealing with real men by the thousands, real conditions, and be assuming the responsibilities of sacrificing many human lives perhaps when making a miscalculation or a mistake in judgment. In the map-problems, when I balled things up, I only made a fool of myself and got a rotten mark on my work. But in this case, rotten marks would be symbolized by hundreds of graves filled with American soldiers. So perhaps you can appreciate to a degree what a terrible strain it is upon one's mentality and conscience to be placed in such a position.

Don't think for a moment that the part of the work entrusted to me was of great importance, yet in planning such a thing, every little detail has its direct bearing on the thing as a whole, no matter how insignificant that detail may be; and no matter how low in the scale of importance my particular job happened to be, it was sufficient to give me more than one brain-storm of the most acute worry I have ever known. Gosh! I lived and dreamed and talked the thing until my brain seemed to refuse to function on any other subject. I studied every conceivable type of map of the country so constantly that I felt I could recognize any square foot of it in the dark as an old and familiar friend.

Doubtless I am boring you with this long and involved effort to tell you about how we all worked so constantly on this thing and at the same time maintaining the greatest secrecy, yet it *was* a terrific strain, though wonderfully exciting and thrilling, for it was to be the maiden effort of the American Army, which was still so young and crude, and naturally the few of us who knew what was projected wanted it to be successful, if human effort could make it so. Well, it *was* a success of more than minor importance. Of course not to be compared with some of the really big things done by the British and French, yet considering its tactical advantages and its influence (both directly and indirectly) on the situation as a whole, it is nothing to be ashamed of, considering that the same thing had been tried twice before by others and had been a failure in each instance.

After this prelude maybe you can picture my state of mind when I left here two days before the show began to go up and watch the performance. Being unrestricted in my movements and for the time being vested with authority to issue orders in the name of the General, if I considered it necessary, I left here in my car one afternoon in a frame of mind that ranged between exultation and sickening dread. The red, white, and blue silk brassard with its 5-pointed star embroidered in gold, the insignia of a General Staff Officer from G. H. Q. that I was wearing, represented far greater authority than I ever expected my humble self to possess. I shall always treasure that bit of silk for its association with the most wonderful moments of my life.

Feeling that I knew where the most interesting things would happen, I went first to the headquarters of the Army Corps covering that part of the front. After getting the information I wanted there, I decided that a certain division would be the unit that would develop the situation in which I was most interested, so I went to the P. C. [Post Command] of that division. Subsequent events proved my guess to have been a good one.

The weather for a week before the show started had been unusually rotten. Torrents of rain had made all of the roads quagmires. This had its disadvantages, but really played into our hands, for it helped us to make our concentrations with most successful secrecy and made the surprise party almost complete to the Boche. After arriving at the Division P. C., I decided that to see the real thing, I would have to go up to the actual front and see the thing off. As you perhaps know, the attack was preceded by a four-hour bombardment, and when that began, I went up to one of the attacking battalions and attached myself to a company, for by this time I had decided that the only way to test the efficacy of the long worked-over plan and to form a basis of possible future plans, was to watch the thing function from the actual

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front line and work from there back to the higher command, rather than reverse that order. Also, I had a pretty well defined idea that when that line once got started, it would be devilish hard to catch up with again.

It was raining with almost tropical violence, and though I had discarded everything but my map-case, prismatic compass, and gun, it was no easy matter to make my way up to the jumping-off line. Gee, it was spooky! Part of the time I was knee-deep in mud, while on the road, and then having to make straight across country following the compass-bearing. That little trip of about three kilometres taught me some valuable lessons.

I left the Division P. C. at 1 a.m. and knowing that zero hour was to be at five, of course four hours seemed absurdly ample to cover the distance of less than two miles. As a matter of fact, it took me nearly three hours, and you will laugh at my stupidity when I tell you why. In order to protect my compass, a delicate and expensive instrument, from the rain, I held it close to my face while reading it in the dark; but in addition to protecting it from the rain, my steel helmet also caused a deflection of about fifteen degrees, which was something that I did not reason out for about an hour, by which time I was a considerable distance from where I was headed. I am glad to say that I did have sense enough to comprehend the trouble at last, and from then on, when I made a reading, I removed the 'tin' hat and protected the compass with my hand. Is it any wonder that I am in a constant state of fear that some day they will discover what a bone-head I am?

Having left my rain-coat behind, of course I was drenched, yet I was not cold, because I had too many other things to think of.

At last I found the exact place for which I was looking by stepping on the legs of one of the men lying just outside the jumping-off trench. My arrival was duly heralded by a mild outburst of profanity from both the man on the ground and myself, actuated on his part doubtless because of the hob-nails in my shoes, which hurt like the devil when pressed into his legs, and on mine because I was startled almost into a spasm when I realized that I was standing on a human being.

Having about an hour to wait before zero, I found the platoon commander, who happened to be a boy from Virginia who couldn't get nearer than 'tar' to the accepted pronunciation of 'tire', as I learned in subsequent conversation, and laid down beside him. I have been a bit uncomfortable in my life, but those sixty minutes lying in the mud and drenching rain come pretty close to being the most damnably uncomfortable period of my 39 years existence. Yet I would not take a million dollars a minute for it now.

We were just over the crest of a small hill and had a perfect view of the country in front of us for quite a distance.

I am not going to be such an idiot as even to attempt to describe to you the effect of the perfect hell of shell-fire that our guns of all calibres were raining all over that trench system. It seemed as if the whole world as far as the eye could see, was a huge inverted collander with spurts of liquid flame shooting through each of the thousands of holes, the size of which being determined by the size of the bursting shell. It really was a mystifying illusion and it was practically impossible for me to realize that the whole world was not afire under its crust, and that the flames, being urged upward by some demon in hell, were frantic in their fear and haste to escape from their diabolical tormentor. It seemed impossible for me to comprehend the thing and believe in its reality.

During such moments of mental stress, one's mind plays many pranks. I would suddenly find myself oblivious of the marvelous spectacle out there in front and awaken to the realization that the youngster shave-tail lying beside me was discoursing on the merits of the Stutz car we drove at home, which explains how I knew he couldn't say 'tire'. Well! we simply waited for zero, consulting our watches occasionally, so as to know when to prepare to start. I knew what was going to happen at zero hour and really would not have needed a watch to know when it arrived, but I actually counted the seconds of the last minute as a matter of curiosity, to see how near schedule our barrage would be put down. Just as I counted the 59th second the peculiar half-bark and half-crackle of the 75s, which you soon learn to distinguish, began with a ripple; then ran across the front and almost instantly merged into a continuous roar, and out in front about a hundred metres away, you could see a lurid line that paralleled the departure trenches almost as perfectly as if it had been laid out with a T-square. Everybody was glad to get up and stretch a moment and then start forward at a deliberate pace. It was known that the barrage would advance at the rate of 100 metres per four minutes, so the only thing you had to do was to keep your place in the line and keep on going. You instinctively feel when you are the proper distance from the barrage, and as you expect an occasional 'short' it does not seem to disconcert anyone when it arrives. If you are too close to it to avoid stopping a fragment, well, that is the rub of the green and you are just out of luck.

The Boche had spent four years of constant work in organizing their position and when a few hours later, under more placid conditions, I had a chance to examine the maze of wire and intricate trench system that looked like some huge and complicated *motif* of lace worked in the ground, I marvelled at the possibility of anybody getting across it, yet that bunch did cross it in perfect order and with a nonchalance such as you would have considered possible only when strolling along a perfectly graded cement sidewalk. Somehow you didn't know that any wire was there and of course it was comparatively easy to jump the trenches. Please believe me when I assure you that so far as I was concerned, I was hardly aware of the wire or other obstacles in my path at the time and not until I began to trip over what had been a pair of shoes and wrapped puttees, which upon

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investigation I discovered were reduced to ribbons, did I have any real consciousness of having crossed that wire. If you had seen me when I returned to the P. C., you would have laughed, for nothing worth while was left below my knees, either of my breeches, puttees, or shoes, so I resorted to the brilliant idea of using some first-aid bandages in place of what *had* been a perfectly good pair of Fox Frayless.

Well! that is about all there was to it. They simply kept on going, and at no time did they vary more than 12 seconds in reaching any of their objectives. The Boche didn't have much fight left in him after that bombardment, and did surprisingly small execution with either his machine-guns or his artillery. Only two men were killed in the platoon I was with and not many others were wounded. I continued to advance with the line until about 7 a.m. and then decided to return to the Brigade P. C. to report the exact position and progress of the attacking line. All telephone wires had by that time been cut by shell-fire. Naturally I thought that progress to the rear would be easier than going in the other direction, but as a matter of fact, the real excitement of the morning was still due me.

A well organized mopping-up line was following the attack to clean up all out-of-the-way places that the front-line troops could not waste time to bother with. These moppers-up were doing their job quite thoroughly and were not as close up to the front line as I thought, as was made evident by the number of Boches still to be seen darting about in the rear of the front line; but still I thought nothing of that until I discovered that these stray Boches were not as friendly as they should be under the circumstances. Well, that is where my real fun began. In going through a small wood with rather thick underbrush, I kept my eye peeled for trouble and my automatic in my hand, though I really did not expect to use it, wherein I was mistaken. About fifty feet ahead of me I observed a Boche duck behind a tree in a rather threatening manner, so I approached cautiously, thinking he would surrender, but as I stepped into a small cleared space, the fool let go with a hand-grenade and ducked behind the tree again. Knowing that at least six seconds must elapse before the thing exploded I naturally ran away from it, but in the direction of the tree behind which he had ducked. I arrived at the tree just as the grenade exploded and as he put his head around to see what had happened, his nose almost touched the muzzle of my gun, and it makes me chuckle to think how surprised he must have been if he had time to think during the fraction of a second that elapsed before I pulled the trigger. I don't know what he looked like, because I couldn't get a good look at him during our little dodging match, and afterward—well, his face, or what was left of it, was not very pleasant to look at, so I made only a cursory examination. I am not the least bit ashamed to say that I was so darned tickled that I grinned all over and felt very much as I did the time I shot my first buck up in the Adirondacks, an occurrence that was immediately recalled to my mind.

Feeling pretty good, I went merrily on my way, thinking that my part of the show was over for the day, but again I was mistaken, for almost immediately another one started to rush me with a vicious-looking trench knife. He was just a bone-headed damn-fool, for I had him covered all the time and ordered him to halt twice. It is true there was considerable noise and I did not strain my voice, yet he could not have mistaken my intention, which was to make him my own little prisoner. However, he kept on coming, so I let him have it. Hutch would say I was a damn poor shot, for I aimed at his stomach, but really hit him above the heart and at ten feet that is not very good shooting, but it did the trick. He fell over backward like he had been hit by an axe, for that Colt has a terrible wallop with the extra heavy ammunition we use over here and I was really amazed at the result. But here is really the interesting part. When I looked this bird over, imagine my surprise to discover the figure 7* on his shoulder-loop. Gosh! I almost yelled with delight, and, although against intelligence regulations, I could not resist the temptation to rip off one of the loops on which the magic figure was embroidered in red, and I think I shall send it to the new Company I as a souvenir of the occasion. So at last I have two notches in my gun. Altogether that makes three of those pups I am *sure* I have to my credit, one each for you and one for myself. The fourth I feel pretty sure of, but I didn't actually see him because he seemed to fall in the trench. The first two you will recall I mentioned in a letter either to you or Hutch, as having gotten from a sniping-post last winter when I was with the Guards. Should they by any chance bump me off now, I will at least have the satisfaction of knowing that the ratio is three to one in my favor.

I simply can't find time to repeat all this junk in a letter to Hutch, and knowing how his blood-thirsty soul will envy me my opportunity, won't you please tell him about it, and be sure to tell him that though I frankly acknowledge his superiority over me in the shooting line, I'll be damned if he could do better than get a hundred per cent of hits. Yes, it gets into your blood in time. Last winter I felt the need of a drink when I saw that chap I potted, but this time I felt more like buying a drink for the whole A. E. F. I was so darned well pleased with the luck I had.

Finally I got back to where I had left my kit, got into another pair of breeches, shoes, and puttees and was as happy as a kid on Xmas morning. By noon we had collected about a thousand prisoners at the P. C. and I had a most interesting time in looking them over and talking with the surprisingly large number who spoke English and quite a few others who flattered me by pretending to understand my attempts at French. Really you can't imagine how interesting that was. Also, don't believe all the bunk the papers print about the dilapidated condition and unnourished state of the Boche soldier. He is clothed and shod as well as our men are and particu-

*The writer belonged to the famous Seventh Regiment of the New York National Guard.—Editor.

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larly neat and clean in appearance. His food is restricted in variety, of course, but he shows absolutely no indication of not having all he needs to eat. Neither has he many misapprehensions regarding what we have done and are capable of doing in this war. He underestimates our numbers now in France by not very much and he certainly did *not* expect to be mistreated when captured. In fact, all of them were obviously tickled silly to be prisoners and at times when a new batch would arrive at the pen it was just like old home-week, the way they would greet each other, shake hands, and laugh at what they seemed to consider their good fortune.

I must admit that I had the surprise of my life that morning in many things. Our line kept on going and soon the question of traffic became of vital importance. Really, my dears, it beggars description. I simply can't convey to you any idea of the condition of those roads used to supply that rapidly advancing line. Naturally, there were no roads across No Man's Land and the elaborate trench systems on both sides of it, so they had to be built and damned *tout de suite* at that. Building roads under shell-fire is not the pleasantest occupation known to man, but they were built nevertheless, and were soon jammed with more different kinds of vehicles that roll, crawl, and creep than you have ever seen. In my nine months over here I had not seen a lot of those darned queer-looking things before, though I knew most of them by name. It is not difficult for an army to advance, but the biggest job is to supply it and in every bog show the words 'transport' and 'traffic' soon become the things that cause more human anguish, worry, and anxiety than I ever before knew could be packed into two such simple terms. But I could write volumes about that and not begin to scratch the surface of the problem.

Thank God, I managed to realize to a degree the real importance of that prosaic subject that used to bore me nearly to death at the Staff College last winter. Really the whole game of modern warfare is based upon supply, and the things you can feed into the insatiable maw of an army on the move without beginning to satisfy its needs, makes one's brain reel when trying to comprehend it. Producing an army of 5,000,000 men is a cinch compared to keeping it supplied after you once have it, and we had only a small fraction of that number of men engaged in the St. Mihiel show, yet our problems nearly turned my hair white. Incidentally, I am the beneficiary of the greatest piece of luck you ever heard of in connection with that traffic situation. I had to go past a cross-roads that was having the tar shelled out of it with both H. E. stuff and gas, a nasty combination. Just before I arrived the Major in charge of traffic there was killed by a shell and things were rapidly getting into a damnably confused state. That particular cross-roads was of vital importance to our supply system and I naturally couldn't stand around and see my first little pet battle spoiled in that way, so I took over the job for 18 hours, and for the first time in my life I got some real advantage from an ability to cuss mildly. You know you really can't be a successful traffic cop without a little profanity at your disposal. Of course, having to wear a gas-mask is a bit of a handicap, for it requires you to eat your own words, as it were, and also gives the enraged drivers of all sorts of vehicles a chance to cuss back at you without being court-martialed, but the blue tinge your cussing gives to the atmosphere seems to neutralize the effect of gas. Anyway we managed to keep things moving fairly well past that damned place and the day after my return here I was informed, greatly to my surprise, that I had been made a Lieutenant Colonel. Funny old world. For over a year a lot of people have seriously tried to make me a Major and finally as a great concession their efforts were successful and in less than a month thereafter, just because I spent a few hours having the time of my life thinking up new phrases of profanity while serving my novitiate as a traffic cop, they, with the stroke of a pen, turned my gold leaves to silver. If that poor chap at that cross-roads, whom I knew quite well, and he was a corking officer, had not had the hard luck of being killed, I suppose I would have remained a Major the rest of my military career. Rotten game this and I am beginning to hate it like hell at times, when I think of that phase of it, yet it gets into your blood somehow and in other ways is the most alluring and fascinating occupation one can possibly engage in. I am reeking with rank now and Heaven knows I am not seeking more, I just want to get back with that old bunch for one rip-snorting scrap, for I know what they can do and I want to be with them when they do it. If they will only let me do that, I would promise never to peep again, no matter what job they put me on. But what more can I do? And all the time it worries me nearly sick for fear that some of that crowd may think that I am really not making any effort to get back and that I am quite content to enjoy the privileges and what they probably think are the comforts of my present job. Oh! if they could only know how I feel.

I had to stop here rather abruptly and start for Verdun in connection with another marvelous show that began on the morning of September 26. I have just returned to get some more things to wear and am off again this afternoon to another part of the front. Of course, you are reading all about what is going on over here at present. I could write you volumes about some of the things I have seen during the past ten days, but things are moving too fast to make it possible for me to find the time. I wanted to tell you about the amazing accomplishment of the 3rd battalion of the old Regiment. It's tragic, but wait until you hear from me about it before becoming unduly alarmed. Be careful not to mention this to anyone so as to avoid wild rumors. Just remember that Company I and the other three companies of the battalion will occupy one of the most brilliant pages in the history of this wonderful war. That is not romance, but cold-blooded fact, so much so that I fear you will be shocked and sad if what I believe to be true is verified, yet it is glorious. I don't know when I will be back, so am scribbling these few lines of attempted explanation and will start along. My God! but it is great to be alive, in France and in this war.

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Credit Terms in Central America and the West Coast of South America

A recent issue of the 'British and Latin American Trade Gazette' contains an article on credit terms in Latin America, from which the following is taken:

Reasons for Long Credits

Long credits are not merely a question of the merchant wishing to keep his customer's cash as long as possible before paying the manufacturer or shipper. As a rule, the process of getting goods through the custom-house is a lengthy one. In any case the merchant likes to have the goods in his warehouse examined and listed before paying. That is not all. Even if he is acting only as an agent, much time is needed to get the goods from the port of entry to some customer up-country. This is so even in Chile, with its extensive traffic facilities. When it comes to sending merchandise to less accessible districts in Bolivia, Colombia, or Peru the difficulties are immense, often involving several transfers, and perhaps transport by pack-animals or human porterage. Up-country purchasers are notoriously slow payers. Three to six months may easily elapse between the time a shipment arrives at the port of entry until it reaches the hands of the retailer, to say nothing of the 'consumer.' German commerce was helped by the Teutonic system of banking. Long bills were easy to accept; through the financing houses, exports were actually set against imports.

Bills are generally made payable either in London or at a local bank. In the latter case a commission of $\frac{1}{4}$% is added to the amount. Quite commonly, too, $2\frac{1}{2}$ to 3% is added, according to the cost of discount charged. Provision should also be made for exchange. All this should be noted on the bill, together with any interest charged. If the bills are intended for negotiation, they should be accompanied by (1) bills of lading, the number issued, with indorsement of bank or shipper; (2) invoices in duplicate; (3) consular certificates in duplicate; (4) policy of marine insurance (in duplicate when possible). Drawers should give definite instructions whether the documents attached are to be delivered against acceptance or only on payment; what is to happen to goods in the event of acceptance being refused; rate of abatement (if any) to be allowed in the event of payment before maturity; if the bill is to be protected or not on (1) non-acceptance, (2) non-payment; who is authorized to act on special instruction.

Bolivia

Terms range from 90 to 120 and 150 days, it being sometimes stipulated that the date should only run from the receipt of the goods. The law provides that a renewal is not valid unless the renewed acceptance bears the signature of both drawer and drawee. As a rule, drafts are accepted only on the arrival of goods at the custom-house. Collection commission at La Paz and Oruro is $\frac{1}{2}$%, and in other centres 1%.

Chile

Bills maturing 90 days after arrival of goods at Valparaiso and up to 120 days after arrival at Iquique, are customary, importers paying cost of exchange, occasionally discounting, and rate for collection. The collecting rate for Valparaiso is $\frac{1}{4}$%, and for other banking centres $\frac{1}{2}$%. Chilean customs regulations do not permit of bills of lading being made out 'to order'.

Colombia

Very little business is done on open credit. Usually buyers require from 30 to 60 days after the goods have passed through the custom-house, but six to nine months bills are common, cost of discount plus interest at 6% being generally added. Local banks charge 12%. Discount for cash or prepayment is allowed at the rate of 5% per annum. Collection rates average from $\frac{1}{2}$ to $\frac{5}{8}$%. Many wholesalers allow retailers and agriculturists six months credit, so manufacturers that take this into consideration naturally have the best chance.

Costa Rica

Many importers are prepared to pay cash against liberal discounts. Otherwise bills are taken for three or six months, carrying interest at 6%.

Honduras

Six months credit is general, but many leading firms buy on discount terms. At Puerto Cortez, 30, 60, or 90 days, plus 6%, or 5% discount, are the prevailing terms.

Ecuador

Open accounts are not general, 30, 60, and 90 days' sight bills being the rule. For up-country trade, 3, 6, and as much as 12 months credit after receipt of goods is often granted, plus 6% interest, as against the 7 to 9% of the local bank rate to merchants. Bank collecting rate, paid by the buyers, at Guayaquil and Quito is $1\frac{1}{4}$%.

Mexico

Recent military and political events have greatly disturbed business, but normally the commercial world of Mexico stands well in repute. A considerable amount of open credit is granted to known firms. Generally speaking, merchants desire credit for at least as long as will enable them to get the goods through the customs, ar-

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ranged in stock, and catalogued. Terms vary much according to locality and also the class of merchandise. In Mexico City the customary terms are 2 to 2½% off for cash in 10 to 30 days, 60 days net, and 90 days plus 6%. Here, as in Monterrey and a few other big places, machinery and hardware are invoiced at 60 to 90 days, and 120 for big amounts. Indeed, four to six or nine months bills, with interest at 6% are quite usual with the retailers. Local bank rates range from 10 to 12%. At Acapulco three to six months bills are the rule, interest charged at 6% per annum, with a similar discount. Many houses, however, prefer cash for good discounts. British manufacturers in the past have shown themselves unwilling to grant the long-term credits often expected, if not demanded, by business men in Latin America. On the other hand, most of the Hamburg and Bremen merchants were ready to give the accommodation desired. That the position taken was justified, it is contended on behalf of purchasers, was shown by the readiness with which banks discounted approved bills, thus obviating any question of credit on the part of manufacturers. Others hold that the credit expected by buyers was unduly long. Since the Germans have been shut out of commerce shorter-term settlements have been accepted without much demur. It is both fair and wise, however, to give consideration to the importer's point of view. At Aguascalientes, many of the leading firms have running open accounts, which are balanced every six months. At Chihuahua, bills are made for four to six months from invoicing. At Nogales, the prevailing terms are sight bills at three, six, or nine months, with a stipulation of 1% per month after they become due. At San Luis Potosi, three to six months and at Saltillo, six months' bills are usual, with interest at 6% for renewals. At Vera Cruz, German houses granted six months paper. A prevalent method in Mexico is to pay for mining, heavy agricultural, and industrial machinery, one-third of price with order, one-third on receipt of documents, and balance one, two, three, or even six months after delivery. Another custom is for manufacturers' agents in Mexico City or one of the larger ports of entry to hold stock, which is sent to retailers on consignment. This applies to motors, small machinery, and tools, some classes of hardware, and even watches and jewelry.

Nicaragua

Bills are drawn payable in London at six or nine months, with interest at 5 to 6%. Bills are noted before the bills of lading are delivered.

Panama

Usual terms, six months. Bills of lading and consular certificate are attached to the bill, which is accepted and noted at the bank or shipper's broker before delivery of documents. Most of the business in Colon is done through commission houses, who ship c.i.f. to port.

Peru

Shipping documents are delivered against acceptance of bills payable in 60, 90, or 180 days in London. Interest is charged at 6%, and up to 8% for extension. With machinery, payment of one-third on receipt of invoice is usual. Six months credit is quite common, and some sugar-machinery makers have granted three years deferred payment, with interest at 6% on balances. Protest has to be made within eight days, and protested bills are valid for only four months. Collecting charges in Lima and Callao are ⅜%, in other banking centres, ½%.

Salvador

Much of the business with Europe has hitherto been carried on through commission houses. When credit is granted bills are usually drawn at six months or at six and nine months, documents against acceptance. Interest is charged at from 5 to 7½%, which compares with the local banks' interest on loans of 10 to 12%. A growing number of importing houses prefer to obtain cash terms, with 2 to 3% off invoiced prices.

Final Count of Losses to Shipping by U-Boats

The total tonnage sunk by submarines since August, 1914, is 14,923,990 gross tons, spread over the following years:

	Gross tons
1914 (five months)	681,363
1915	1,724,720
1916	2,797,866
1917	6,623,623
1918	3,096,418
Total	14,923,990

The Allied and neutral losses from January 1917 to, and including, October 1918 were as follows:

	Gross tons	
	1917	1918
January	409,832	357,508
February	574,856	387,949
March	634,685	401,463
April	893,777	318,581
May	630,336	364,990
June	712,721	279,799
July	575,949	324,774
August	549,363	328,172
September	369,161	239,600
October	487,337	93,582
November	333,433	.....
December	452,063	.....
Total	6,623,623	3,096,418
Average	551,968	309,641

Until May 1918, the losses by months of Allied and neutral shipping exceeded the deliveries from Allied and neutral yards, but during the latter part of the year the builders gained on the submarines to such an extent that, for the first ten months of the year, deliveries were 700,000 tons ahead of sinkings.

Los Angeles, Nov. 30.—To find relief from insomnia, President Heber J. Grant, head of the Mormon church, Salt Lake City, has arrived in this city. He is at the home of Joseph L. Robinson, head of the Mormon mission here. President Grant said he was the first Utah born president of the Mormon church.

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STEEL SHAPES FOR SHIPS STANDARDIZED

As a result of conferences between representatives of the Emergency Fleet Corporation, the shipbuilding firms, and the steel-makers, the following list of standard shapes, including in all 27 shapes and 115 sections, has been adopted.

The steel-makers decided that, inasmuch as the British standard sections of ship-channels and shipbuilding bulb-angles appeared to be better adapted to economical manufacture than the American standards, and inasmuch as the new rolls that had been turned in recent years to produce those sections conformed in general to British standards, hereafter American standards should be discontinued and rolls in hand not to British standards should be re-dressed at as early a date as possible in order to roll such sections as closely to British standards as slightly divergent methods of procedure would allow; particularly in view of the further fact that the adoption of British standard sections would enable American mills to compete on an even basis for ship steel wherever utilized in shipyards, either at home or overseas. Sections not shown in this list may be included on shipbuilders' schedules with the proviso that they be specified only when they can be ordered in lots of not less than 40,000 lin. ft. per shape at one time, or by special arrangement with the mills. Orders for such shapes should not be divided among mills, but the entire quantity of each shape should be placed at one mill with the stipulation that the mill may, at its option, roll, ship, and invoice all the tonnage at one time, regardless of position in shipyards and fabrication schedules.

Dimensions in inches, weights in pounds, bulb-angle weights approximate

Equal-leg angles

Size	Thickness	Weight per ft.	Size	Thickness	Weight per ft.
6 by 6	0.7500	28.7	3½ by 3½	0.6250	13.6
"	0.6875	26.5	"	0.5625	12.4
"	0.6250	24.2	"	0.5000	11.1
"	0.5625	21.9	"	0.4375	9.8
"	0.5000	19.6	"	0.3750	8.5
"	0.4375	17.2	"	0.3125	7.2
"	0.3750	14.9	"	0.2500	5.8
5 by 5	0.7500	23.6	3 by 3	0.5000	9.4
"	0.6875	21.8	"	0.4375	8.3
"	0.6250	20.0	"	0.3750	7.2
"	0.5625	18.1	"	0.3125	6.1
"	0.5000	16.2	"	0.2500	4.9
"	0.4375	14.3			
"	0.3750	12.3	2½ by 2½	0.3750	5.9
			"	0.3125	5.0
4 by 4	0.7500	18.5	"	0.2500	4.1
"	0.6875	17.1			
"	0.6250	15.7	2 by 2	0.2500	3.19
"	0.5625	14.3	"	0.1875	2.44
"	0.5000	12.8			
"	0.4375	11.3			
"	0.3750	9.8			

Unequal-leg angles

6 by 3½	0.7500	22.4	4 by 3	0.5000	11.1
	0.6875	20.6	"	0.4375	9.8
	0.6250	18.9	"	0.3750	8.5
"	0.5625	17.1	"	0.3125	7.2
"	0.5000	15.3			
"	0.4375	13.5	3½ by 3	0.5000	10.2
"	0.3750	11.7	"	0.4375	9.1
			"	0.3750	7.9
5 by 3	0.5000	12.8	"	0.3125	6.6
"	0.4375	11.3	"	0.2500	5.4
"	0.3750	9.8			
"	0.3125	8.2	3 by 2½	0.3750	6.6
			"	0.3125	5.6
			"	0.2500	4.5

Bulb-angles

Size	Thickness of longer leg	Weight per ft.	Size	Thickness of longer leg	Weight per ft.
10 by 3½	0.7250	35.2	8 by 3½	0.5500	23.2
"	0.6750	33.2	"	0.5000	21.6
"	0.6260	31.1	"	0.4500	19.6
"	0.5750	29.1	"	0.4000	18.0
"	0.5250	26.9			
"	0.4750	24.9	7 by 3½	0.5250	20.0
			"	0.4750	18.6
9 by 3½	0.6250	28.6	"	0.4250	16.8
"	0.5750	26.6	"	0.3750	15.3
"	0.5250	24.8			
"	0.4750	22.7	6 by 3	0.4750	15.6
"	0.4250	20.9	"	0.4250	14.1
			"	0.3750	12.8
			"	0.3500	12.2

Ship-channels

Size	Thickness	Weight per ft.	Size	Thickness	Weight per ft.
12 by 3½	0.7000	40.8	8 by 3½	0.5250	25.3
"	0.6000	36.8	"	0.4250	22.6
"	0.5000	32.7	"	0.3750	21.2
"	0.4500	30.6			
			7 by 3½	0.5000	22.5
10 by 3½	0.6750	34.8	"	0.4000	20.1
"	0.5750	31.4	"	0.3500	18.9
"	0.4750	28.0			
"	0.4250	26.3	6 by 3½	0.4750	19.8
"	0.3750	24.6	"	0.3750	17.8
			"	0.3250	16.8
9 by 3½	0.6500	31.3			
"	0.5500	28.3	6 by 3½	0.3500	15.2
"	0.4500	25.2	"		
"	0.4000	23.7			

Tees

6½ by 6½	0.4500	19.8

Hatch-zee (Tyzack)

2½	0.5000	13.6

15-in. structural channels

Thickness	Weight per ft.	Thickness	Weight per ft.
0.8180	55	0.5240	40
0.7200	50	0.4260	35
0.6220	45	0.4000	33

Improved working conditions in the big industrial plants are strikingly emphasized in the following incident:

A high-school boy, who has been employed as time-keeper, has had the opportunity of sleeping a couple of hours just before quitting time.

When the boy got home late, one morning recently, his father asked him if his work had kept him at the plant.

"No," replied the boy, "the fellow who usually wakes me up forgot to do so this morning, and I slept two hours after it was time to go home."

"Slept two hours after quitting time?"

"Yes," replied the boy, "but it is all right, I charged it up to overtime."—Youngstown Telegram.

"So she spurned your proposal?"

"Yes."

"Got any idea why?"

"Well, I proposed by letter, and I have an uncomfortable suspicion that I absent-mindedly stamped the missive 'Dictated, but not read'."—Boston Transcript.

Puzzled Income-Tax Official—And is the separation from your husband an official one?

Munition Kate—I dunno about 'official.' All I know is as when 'e comes to our 'ouse we calls the police and they chucks 'im out.—London Punch.

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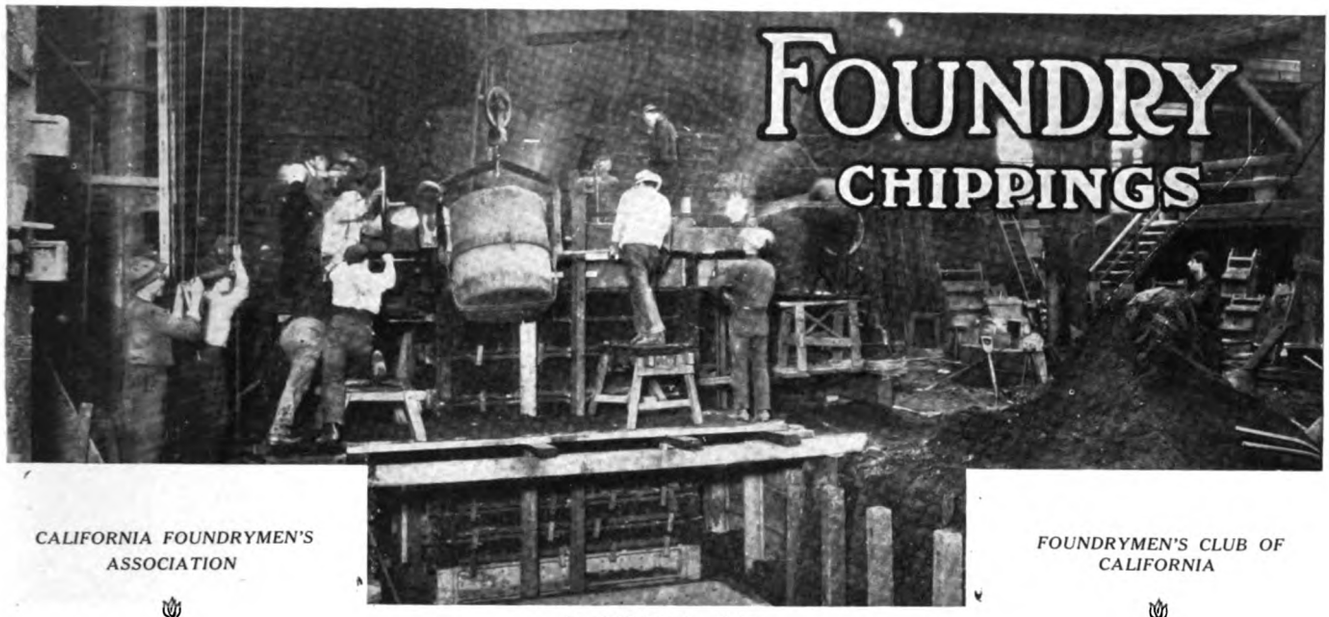

CALIFORNIA FOUNDRYMEN'S ASSOCIATION

FOUNDRYMEN'S CLUB OF CALIFORNIA

D. GUILD, Jr., Editor
Phoenix Iron Works, Oakland

"Ye Ken at Times a Man Maun Think o' Things"

THE PROBLEMS OF THE HOUR

By James W. Kerr

GREAT events have occurred since last I had an opportunity of addressing, by pen or otherwise, the members of the California Foundrymen's Association.

The effort by force of arms to destroy the rights of humanity has come to an end.

The conclusion of the great struggle, which, but a few weeks ago, appeared to us to be in the distant future, is practically upon us. The roar of the guns has ceased, the midnight skies of France and Belgium are red no longer, gas no longer fills the hollows of the Marne and the Somme. The peasants are returning to their homes, prepared to do their part to efface the outward evidences of this greatest, most brutal, and most wanton crime. The faces of our young men are turned homeward and that new verse of the British anthem has filled the hearts of the mothers of our land like a prayer:

"God bless our noble men,
Send them safe home again,
God bless our men.
Keep them victorious,
Patient, and glorious.
They are so dear to us,
God save our men."

We stand with open arms to welcome our boys back again—the boys we saw march away, singing as they went "We won't come back till its over, over there." They have made good, and their return places responsibilities upon us that we must meet. They were willing, if need be, to suffer in a foreign land at the hands of their enemies, and it is now our part to see that they do not suffer in their home land at the hands of their friends.

The best thing that every employer can do is to see that all men who left our shops to go into the Service, shall have places open for them when they return, so that they may share in the improved conditions that the War has brought. Our enthusiasm and our emotions carry us over many rough spots in life, but the problems precipitated by the unexpected arrival of peace will call for the sober, careful, deliberate judgment of every man. What are these problems?

The first is the return to our shops of the men that left us at the Country's call. This is a matter for the individual employer to consider, and he should see that preference is given to such of these old employees as have returned. The return, however, of so many men to the industrial walks of life, will perhaps create such a surplus of labor in many lines that the usual result, a tendency to reduce standards, may follow. I am giving here my personal opinion of the attitude of the Iron Founders under such conditions, but this opinion is based upon past experience with that body. In the past, the policy of the Iron Founders' Association with regard to their employees has been a liberal and considerate one.

The Association has tried to set aside the old conditions of distrust and industrial warfare and substitute an era of reason based on mutual agreements. Sitting in council with the representatives of their employees, they learned the desires and aspirations of their men. On the other hand evidence could be placed before the labor representatives regarding the extent to which their views could be met without injury to the industry that

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was the support of all concerned. So satisfactory were the results of this interchange of ideas that I feel I do not overstate the facts in saying that nowhere was there a better understanding between employers and their men than that which existed for the past ten years between the Iron Molders' Union of San Francisco and their employers, the Iron Founders' Association.

Since the first agreement was made, just after San Francisco's great fire, peace and harmony prevailed until the war period. During this time several agreements were made, each of them covering a term of years and all of them loyally observed. The record is clean.

The Macy agreement, which has taken the place of the pre-war system, will not be discussed here. It is a war measure, and, as such, we accept it. I believe, however, that nothing will be lost, viewed from any standpoint, by a return to the individual trade agreements. I believe it would be good business policy for workmen and employers in the various industries to get together at once with the purpose of formulating an agreement covering industrial relations for the next two years. If such an agreement can be consummated, stability will be given to trade conditions, which otherwise, to say the least, may become very unsettled.

Assuming that employers want to carry out a liberal policy in formulating a trade agreement, what are the obstacles that stand in the way of freedom of action? There is a limit to the burdens that every industry can carry, and beyond which it cannot go, without impairing its capacity to give a fair return to those dependent upon it for a living.

The burdens that an industry has to meet may be divided into two general divisions; first, external burdens, originating outside of our own borders, such as foreign competition, which are difficult to regulate. The others may be termed internal, self-imposed burdens originating within the borders of our own State. The learned professor that is imbued with socialistic ideals is much in evidence at the present day, and it is to be regretted that the opinions expressed by him are not along constructive lines. In previous articles, I have had occasion to refer to this condition of mind, which would appear to be the same whether leading a revolution in Russia or Berlin, pleading a labor issue in the East, or discussing social problems in California. We trust that our wage-earners will not be influenced by such advisors.

I quote a case in point from press dispatches bearing the date Chicago, December 13: "In giving testimony before Federal Judge Altschuler in the hearing on requests by stockyards' employees for an increase from 40 to 65c. per hour, Professor William F. Ogburn, Federal commissioner of labor, made the following statement: 'Firms which cannot pay their adult male employees at least $1760 annually should be put out of business by the State'. Such rash statements by men of position are accepted by and influence the minds of many of their hearers. Yet most thinking men know that if all institutions paying less than the minimum stated were closed, and their adult employees sent adrift on a quest for $1760 positions, a crisis would be precipitated more disastrous than anything we experienced during the war period.

During the next ten years we will probably have to meet in the markets of the world a competition greater than we have ever experienced. We grant that the lowering of our standards of living is the last thing that should be considered in meeting conditions, but in this battle there can be no slipshod methods on the part of the employer or limitation of output on the part of the employees. The maintenance of our standard of living demands the united and best efforts on the part of all dependent upon our industries.

While the foregoing remarks apply to what have been termed external conditions, the internal or self-imposed burdens upon our industries are the subject of very serious consideration at the present time. In previous issues of 'Metal Trades', particularly in the November number, I have drawn attention to the efforts of certain idealists in our State to impose serious burdens upon our industries, of which Social Health Insurance is the latest example. In placing such burdens upon our industries the plea is made that the price of the product can be advanced to meet the new obligations. There can be no more dangerous procedure than the one proposed, in that it directly and unnecessarily impairs the capacity of an industry to meet competition in the world markets and at the same time maintain a high standard of living among the employees connected with it. If the State of California wants to experiment along these social lines, let it be done openly and fairly by the whole community.

The average employer has enough to tax his energies without becoming a sick-nurse for his men. Those who seek to find favor for their schemes by playing upon the prejudices, which, unfortunately, prevail to some extent in industrial relations, are the worst enemies of the men they profess to serve. The class distinctions that they seek to create, the uncertainty as to future responsibility, the financial drain upon the industries themselves, all combine to cast disfavor upon industrial enterprise.

Let the policy of the day be to return to our agreement plan, which will assure the employee a satisfactory compensation for a reasonable period of time, and which will give the employer that stability of conductions without which no industry can prosper. In getting together on the old lines let it be the duty of employers and employees alike to protect the industry from the evils with which idealists threaten it, for an attack upon the industry is an attack upon both employers and employees.

THE fellow that gets through his mail these days without cutting his finger on some pamphlet about 'reconstruction' is a wonder. Did you ever read one? It says we are approaching a new 'era' (that's the word), and that we must be very careful, keep our eyes open, and use judgment, also that South America is a great country and is hungry for supplies.

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Fifth Annual Banquet of the California Foundrymen's Association

THE fifth annual banquet of the California Foundrymen's Association was held at the Palace Hotel on December 21. The room was decorated in accordance with the season, and in one corner stood a majestic Christmas tree, obtained by the entertainment committee, Charles D. Steiger and Nathan Alper, after many trials and tribulations.

During the course of the banquet, the diners were entertained by several orchestral and vocal selections, also by some fancy dancing. These numbers were enjoyed by everyone, although some dissatisfaction was expressed by those sitting toward the rear of the room because they had not been provided with binoculars in order to follow the *danseuse* more closely. However, they all did as well as they could under the circumstances. After everyone had eaten and drunk enough so that he did not care how badly either he or anyone else sang (?), the congregation indulged in community singing under the guidance of a talented leader, imported for the occasion.

After the uproar had ceased, David Guild, Jr., president of the Association, introduced Edward J. Fowler as toastmaster for the evening. Mr. Fowler welcomed the members of the Association as well as the machinists, pattern-makers, supply-men, and other 'side-issues' that were present. He read telegrams from W. Hohenzollern and other prominent has-beens, as well as several that appeared to allude to various incidents in the trip of several members of the California Foundrymen's Association to the Milwaukee convention, full details of which have not been made public.

He then introduced the first speaker of the evening, G. W. Cartwright, who spoke on the relations between Capital and Labor. Mr. Cartwright confessed candidly that he had no ready-made cure-all for this problem, although he had spent 25 years in studying it. While once a believer in Socialism, he had become convinced of its impracticability, not from books, but rather from the failures that have characterized every Socialistic colony that has ever been attempted. The standard of output in a Socialist colony tends to grade down to that of the slowest worker. Human nature being as it is, the spur of necessity and the opportunity for private gain is required before a man will put forth his best efforts. Mr. Cartwright made a strong plea that the really broad-visioned men, who can be found both on the side of Labor and on the side of Capital, should meet in council and adjust their differences by agreement. Just what the provisions of such an agreement should be, he did not attempt to say, but, concerning the two most important

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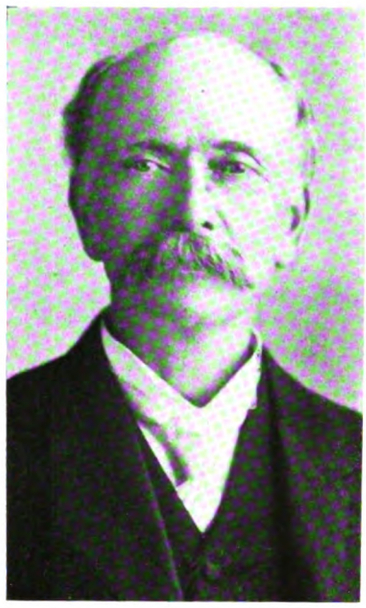

JOHN HEDLEY

DAVID GUILD, JR., President

WILLIAM KINGWELL

THE NEW EXECUTIVE COMMITTEE, CALIFORNIA FOUNDRYMEN'S ASSOCIATION

questions, namely, hours and wages, he set forth the following principles: In determining hours, the shorter the hours, after the point of maximum efficiency has been reached, the greater the cost of living. The point of maximum efficiency should be determined for each industry. What that point is, he did not attempt to say, but suggested that, in general, eight hours was long enough for a white man to work. In fixing wages, the employee should remember that high wages invariably mean high prices, and that there is a point beyond which prices cannot be forced without making foreign trade impossible, thus limiting markets and employment, and, in the end, defeating the employee's own object. The employer, on the other hand, should remember that wages can be so low as to impair the purchasing power of Labor and thus lead to stagnation of business and the ruination of the employer.

James W. Kerr, head of the legislative committee of the Association, was next introduced. Mr. Kerr's address, on 'The Problems of the Hour', will be found in substance on page 37 of this issue.

The last speaker of the evening, Miner Chipman, called attention to the fact that the greatest struggle of the present day was not between Labor and Capital, but between the man who has no money and wants to get money without earning it, and the rest of humanity. He then called attention to the contrast between the two types of man: One, the hero of one of Tolstoi's stories, was so anxious to obtain all the property he could get hold of, that, when he was offered all the land he could travel around in a day, he overtaxed his strength and died just after completing the circuit. The other, John A. Brashear, starting as a laborer at Pittsburgh, by the pursuit of something really worth while, has become one of the greatest astronomers in the world. In closing, Mr. Chipman laid down the principle that the real measurement of efficiency is the number of hours of happiness obtained by the worker.

The solemnity of the addresses was somewhat marred by the attempted arrest of Mr. Charles Haase on a charge of stealing scrap. After several prominent members of the Association had protested, stating that they felt sure Mr. Haase could not have perpetrated this awful crime, the officer was pacified, and no arrest was made, at least at the time. Whether or not the 'cop' waited outside for Mr. Haase, we have not been informed.

After this excitement had quieted down, a sort of syndicate Santa Claus appeared, one Santa Claus from the North Pole, whose voice resembled our friend, Mr. Casey, and one from the South Pole, who was suspected by some of being none other than the great Mr. Snow himself. The syndicate proceeded to read a number of letters they had received from certain members of the Association, expressing a desire for various useful—or useless—gifts. When the presents were taken from the tree, it was discovered that many of these wishes had been gratified. This ceremony being over, William Kingwell, on behalf of the Association, presented some 'real' gifts to the members of the retiring executive committee, Messrs. Hoehn, Macaulay, and Alper, consisting of wallets for Mr. Macaulay and Mr. Alper and a stick-pin for Mr. Hoehn. The gathering then dispersed in time to catch the last boats and the last train down the Peninsula.

If anyone among those present failed to have a good time, he at least was able to conceal it very well. A great deal of credit for this result is due to the members of the entertainment committee.

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Reflections

By R. W. SCHILLING*

NOW that the War is over, one has time to recline in his arm-chair and review the work accomplished in his department during the past four years of the most trying times in the history of the iron industry. It is needless to say that the labor shortage was the biggest factor hindering production in the foundries and machine-shops of this section of the country. As business increased they were compelled to experiment with men of all classes to try to keep up with the work. With these facts in mind, I shall endeavor to relate some of the difficulties that had to be surmounted in running an iron foundry during war-time conditions.

At one stage of the game a bunch of molders arrived from Alabama. The foremen were delighted to hire them a dozen at a time, so scarce was competent help, but, after a day or so, they began to wonder if the shop could long exist with these men. In fact, they were so absolutely rank one might have thought that they had been let loose by some hook-worm infirmary going out of business. They were certainly inertia personified. After getting this aggregation off our hands another batch of 'black birds' from sunny Mexico appeared, but they too were infected with some strange malady or other. Unfortunately, however, they did not stay long enough for us properly to diagnose their ailment. In fact conditions were such during these troublesome times that in the larger shops, where there were two gangs, one coming on and one going off, it was a toss-up with the foreman as to whether one was superior to the other in either ability or industry.

It was my habit to go out and interview a prospective molder and to ask him the following questions: "Are you a snapper, side floor, or heavy molder?" Three-fourths of them would answer, "Anything at all suits me." And sure enough, anything would suit him, but strange to say, very rarely did he ever suit! One man told me during the course of an interview that he was a wheel molder. After being informed that there were no wheel foundries in San Francisco, he exclaimed: "Are they all 'salt cats' out here?" We afterward found out that a 'salt cat' was a marine-machinery molder. After three years of experience with this state of affairs, any one who is in a position to judge must admit that the San Francisco mechanic is far superior to any other workman, wherever he may hail from, when it comes to turning out first-class work.

Speaking of production, it might be mentioned that our shop has increased its poundage on four different occasions. In 1914, 3,598,436 lb. of castings were turned over to the machine-shop. The following year shows a slight increase, 4,407,953 lb. being turned out. During 1916 there was a decided increase, the production being brought up to 10,202,985 lb. The next year, however, shows a decline owing to a strike during September. The present year will be the banner year of all, as indications point to the production mounting well over the 14,000,000 mark, turned into the machine-shop.

A person not used to estimating production might well imagine that a shop making heavy cylinders and bed-plates would naturally have a large tonnage. However, this is not so. If he takes into consideration the time spent by the molders and core-makers on a job of this nature, he will soon discover that the 'snappers' and side-floor men produce more pounds of castings per day than the heavy-cylinder or bed-plate molders.

The production mentioned above comes from a shop 110 by 200 ft., employing one 8-hour shift. The shop is equipped with four overhead traveling cranes, and eight jib-cranes. The battery of cupolas comprises one 60-in., one 48-in., and one 27-in., all inside diameter. The 27-in. cupola has not been used of late. For heats up to 25 tons, we use the 48-in. cupola, and for heats over 25 tons the 60-in. The latter will average ten tons per hour throughout the heat.

While on the subject of production, it might be interesting to relate that in former times an order calling for two marine engines would have been hailed with joy, but recently orders have come at the rate of a dozen sets of triple-expansion engines. We had figured that we had a life-time job on our hands, but they were completed in five and a half months. Then came an order for 40 sets of 27,000-hp. turbines, for the U. S. Navy destroyers. Such an order was a new one for this locality, and the molders had to proceed rather carefully at first, but we finally mastered it. At the present time we are working on 26 sets of triple-expansion engines for tankers and freighters. Each set of these engines requires 155 tons of cast-iron.

The aforementioned destroyers make 37.2 knots per hour with these turbines, which were manufactured right here in San Francisco, a fact of which we may well feel proud.

In passing I might add that at the present time we have over sixteen different nationalities working in the shop, all of whom have proved themselves to be 100% Americans during these troublesome times. This fact only goes to show that the iron foundry truly is the melting pot of the industrial world.

*Foreman, Bethlehem Iron Foundry

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Book of a Thousand Excuses for All Persons Connected With the Foundry Trade

CHAPTER XI

Pattern-makers Excuse for Non-Delivery of Pattern on Time

The pattern-maker Boss has a way of putting things over that is unequalled in any other craft. If you have a pattern to get out, your experience will be about as follows:

In the first place you hand the Boss the sketch or blue-print and explain all about it, not forgetting to impress on him the importance of an early delivery. You are assured that the job will be rushed right out, and you go away with your mind at ease, satisfied that your pattern will be out on time.

If it is a fair-sized job, you come back a couple of days later expecting to see your pattern about ready for the varnish. As you find no trace of the pattern, your first impression is that the pattern has been finished and shipped to the foundry. Of course, you wish they hadn't been quite so speedy and had given you a chance to at least check up the pattern. Just at this time the Boss meanders along, and you inquire about the pattern, and want to know if it has been completed, and how it checked up.

The Boss wears a blank look; he does not seem to remember just what job you are talking about. After much explaining, a light suddenly dawns, and Mr. Boss exclaims, "Oh! yes, I meant to call you up about that job. Your drawing is all wrong. If we made the pattern according to your drawing, the blamed cores would be larger than the pattern. I will get the drawing and you can tell me just what you would like to have me do about it."

The Boss digs around in a mountain of old blue-prints and sketches for about half an hour. The apprentice-boy is called over, and is given a good calling down for losing the drawing. Finally after you had given up all hope of ever seeing your drawing again, it is hauled up from beneath a lot of scrap lumber.

Upon checking the drawing, it develops that the Boss had been holding the blue-print wrong-side-up. Of course he will not admit this, but claims that the drawing was indefinite. He promises, however, to get immediate action to make up for lost time. Next day, the layout-board is ready for the layout.

Two days later, the layout is complete, and it looks as though you were going to get some real action. About this time, you are probably hit by the "Flu", and laid up for a few weeks. During this period, you are not much worried about patterns, and don't really care if you never see another pattern. However your time has not come, and you return to the world of hard knocks.

You find the layout-board exactly as you left it, with the exception that it is pretty well covered with sawdust, shellac, and old glue. Of course, you are tendered a legitimate excuse in the statement that the fellow on the job sawed off a few fingers, and none of the other guys understood the job, and it was necessary to hold it up until his return.

Ten days later, our fingerless pattern-maker returns and starts real work on the pattern. You decide to camp on the job, for if you turn your back, there is sure to be some other rush-job sandwiched in and your job held up. By sticking around and helping where possible, you finally get your pattern into the foundry. The chances are, however, that the job has been canceled, as the customer died of old age in the meantime. You make a mental resolution that if you ever have another pattern to make, you will insist on the pattern-maker putting up a cash bond to guarantee delivery.

When the time comes for the next pattern you seem to have forgotten all about the guarantee, and you fall for the same old smooth bunk once again. It's just as well to forget about the cash guarantee, for whoever heard of a Boss pattern-maker having anything but carfare left after meeting the pay-roll.

Here are a few short excuses, fellows, to be used in case you forget some of your regular ones, and you must stand the customer off:

1. Glue-pot busted.
2. All out of seasoned lumber.
3. Molders drank all the wood-alcohol.
4. Band-saw lost all its teeth.
5. Rats ate up all the glue.
6. Apprentice made a 'bull'.
7. Lumber was too short.
8. Drawing shrunk.
9. Telephone on the bum.
10. Jointer would not join.

Of course there are a thousand more, but let's save them until later.

Our next chapter is entitled 'Machine-shop owners' excuse for constructing a machine-shop'.

Remember, fellows, this is to be a peach. Dig up your old excuses and send them in. You will surely get some new ones in exchange. C.J.P.X.Y.Z.

It is a regulation at the Government Balloon School at Fort Omaha that, no matter what the weather may be, all the windows in the barracks must remain open.

During the frigid weather last winter the post surgeon made a nightly inspection to see that the cadets were sleeping correctly.

As he was making his rounds one night when the thermometer had shriveled to 32° below, he came upon a cot where a 'rookie' lay covered, head and all, by a mountain of blankets and overcoats. The surgeon shook the mass and asked: "Here, there, don't you know how to sleep?"

"Hell, yes; I ought to know how—I've been doing it for twenty-three years," was the reply.

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Trade Notes

Some banquet—and wasn't it a pleasure to have a foundry-supply man give away something without charge.

Jack McKay says he'd just as soon 'wear 'em' if it wasn't for the police.

Dick Schilling of the Unon wears a full-sized smile these days. He says it's a fine boy, and that he's going to make a molder of him. He received a spoon-slick and a floor-rammer for Christmas.

Secretary Thille has been engaged in that winter sport 'fighting the flu.' He's improving now, thanks to advice given by Henderson and Hoehn on the Bermuda treatment.

The Pacific Foundry has a new scheme for removal of old jib-cranes, just loosen the guy-ropes and let the crane do the rest.

January 1 is the day you can pay any old price for scrap. Let us hope the dealers won't make it retroactive.

It's a little early to predict, but the fellow that drops his price now won't have to pay any income tax next year.

Hold a place open for the boys coming back. They deserve the best you have.

A Seattle foundryman has invented an iron so weak it can be used for a toy bank.

The 1919 crop of calendars is out, and, if a fellow can find a date on some of them, he can 'call it a day'.

Last week Kingwell was hungry and he ordered a 'liberty steak' under the impression it was something good to eat. He says the next time he orders any 'liberty' food he wants a straw with it.

A local foundryman says he's been in business here for twenty years and he can't remember a month when some salesman didn't predict a shortage of something or other.

A cost system is like a railroad time-table. It will help you to reach your destination if you will study the routing.

It isn't fair to compare a competitor's casting to a piece of cheese, since the Swiss variety is out of the market.

Metcalf of the Metal Trades Association says the waste-basket he was given at the banquet didn't last long; Thille came along and wanted it all back again.

The old men sure got their glasses on quickly, when the dancer came on, after the flash-light.

The Macaulay-P. David table had a hotly contested game of ping pong with a toy balloon. Neither side scored, as Sam Lader horned in and busted the ball.

John Hedley was dozing when the photographer set off the flash. He came to with a start and yelled "stop her up."

A fellow in the back of the room said that Ed should have turned on more blast.

Those supply men just would get up on their chairs during the cabaret.—J. E. F.

His step is slow, his clothes are thin,
He's paid the Macy scale agin.

There Was a Reason

"I just got back from Australia," said the washing-machine drummer, "and they have some queer customs down there. Human nature is supposed to be pretty much the same the world over, but I notice that each country has its own hobbies.

"I went into a public house, or, as we call it here, a saloon, for a warming potion one cold night. The place was full of miners. When I asked for whiskey, the man behind the bar asked me if I wanted a 10 or 15-cent drink. When I said '10 cents' he laid out the bottle, then a glass and a whisk-broom.

"Not wishing to break any customs or show myself a newcomer in the land, I delayed taking the drink by studying the pictures on the wall. Then I scalped the free lunch for a while. Several people came in; but they all took 15-cent drinks, and consequently got no whisk-brooms with their drink.

Finally a rough-looking miner came in and asked for a 10-cent drink. I watched him as he took up the whisk-broom in his left hand. Seizing the glass of whiskey he poured it down hurriedly and went over to a bench in the corner."

"What did he do with the whisk-broom?" asked one of the younger salesmen.

"He dusted off one end of the bench and then lay down and had a fit," replied the returned traveler.

It cost the young salesman $3 to settle up.—Sacramento Bee.

"Who was Nero? Wasn't he a man that was always cold?"

"No, that was Zero, another guy altogether."

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Foundrymen's Club

The Last Meeting

The meeting of December 5 was one of the best ever held under the auspices of the Foundrymens' Club.

After opening with music and community song the chairman introduced Mr. Charlie Alphabetical Hoehn who acted as spieler for a personally conducted trip to Milwaukee.

When we arrived there Mr. Henderson and Mr. Hasse explained the wonders of machine molding in specialty work and compared our field of manufacture with Eastern conditions. The remarks of these speakers were well received and left food for thought in the minds of both employers and employees.

The remainder of the evening was devoted to a discussion of 'Core-Making for Large Marine-Engine Cylinders'. A committee consisting of Messrs. Lauten, Macaulay, and Niemann had visited the shops doing this kind of work and prepared a report, which was read by Mr. Niemann.

The committee visited the various foundries where such cylinders are being used and received the cordial co-operation of those in charge. At the Union Iron Works, three mixtures are used as follows:

MIXTURE No. 1

2 parts old sand
1 part new sand
1 to 16 sawdust
1 to 40 compound.

MIXTURE No. 2

1 part old sand
1 part new sand
1 to 30 Kordek.

While these mixtures are in general satisfactory, considerable trouble has been experienced in digging out the cores.

MIXTURE No. 3

2 parts sharp sand
1 part new sand
1 to 10 flour.

This mixture is used mainly for facing large cores.

At the Western Foundry the following mixture is used:

3 parts old sand
1 part new sand
1 to 14 sawdust

This is mixed very wet, and no trouble is found in removing the cores.

For high-pressure cylinder-cores a mixture of 2 parts sharp sand and one of red sand, with 1 to 26 of Kordek is used. This also gives no trouble.

At the Enterprise Foundry a mixture composed of equal parts of gangway sand and burnt sand, with 1 to 5 red sand, and either 1 to 15 of sawdust or 1 to 35 of compound has been found satisfactory. In the discussion that followed, some of the more important points brought out were the superiority of power-mixing over hand-mixing, and the importance of keeping track of the temperature of the baking-oven.

In my opinion the Policy Committee of the Club is to be congratulated upon devising this plan for a committee to investigate problems in the several shops and to make a report on its findings. In this way many good ideas are likely to be brought forward and the different experiences of various shops on the same problems brought up for debate. Messrs. Lauten, Macaulay, and Niemann are entitled to the thanks of all present for the clear way in which they made their report, and also for the labor and time that they devoted to the subject.

Mr. Koch is worthy of special mention for the Christmas music rendered by the orchestra during the evening.

Of course we finished with the St. Bernards, and you know. Everyone went home happy except Al Snow who, 'tis whispered, is a little peeved over losing his job as chief pound master. BILL.

Review of 'Side-Lights'

If you want to live in the kind of a town
Like the kind of a town you like,
You needn't pack your clothes in a grip
And start on a long, long hike.
You'll only find what you left behind,
For there's nothing that's really new;
It isn't your town that is to blame,
It isn't your town, it's you.

F. D. P.

N. B. Parsons says that's why Charlie came back.

Get That Habit

Attend the meetings of the Foundrymen's Club and see how soon it becomes a habit.

We had a fine meeting last month but Oh! boy, wait until January 16, 1919.

You sure will see some hum dinger at that time.

We are going to have a rattling good 'Brass talk' that will interest every brass-man in the Bay region.

The orchestra are primed to give us the very best they have.

Frank Kramer, our vocalist, will lead you in some of the newer popular airs.

A new core committee is already out getting the 'dope' for the discussion. 'Mixtures for small miscellaneous cores' will be the subject that you will discuss. Gas-engine cores, stock-cores, brass-cores, and in fact all of the little dinky cores will receive their just due.

Eats, well maybe there will be a change this time. The dogs were sure tough last time, and maybe we need a rest from them. But another of those high-class committees will pass out something that will please you.

Don't forget that we meet in the regular place, Yosem-

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ite Hall, Native Sons building, Mason street between Geary and Post, San Francisco.

Maybe the fellow next to you doesn't understand the poster in the shop. Read it for him, for you have been to the Club meetings and know how welcome you all are. Bring him along.

Don't forget that the meeting is on Thursday evening, January 16, 1919, in Yosemite Hall.

You'll sure get the glad hand.

Industrial Education and the Foundrymen's Club

AMONG the many changes that the War has brought, few are more important than the new attitude toward industrial education. We are living in a new day, where the man is placed above the dollar. In other words, the value of trained men is at last appreciated. To supply the demand for trained men, education must be adjusted to meet the new conditions. Many of the fads that have found their way into the schools during the past two decades must be abandoned in favor of more solid and practical business training. The present tendency is away from professional toward technical and business occupations. Changes in the school system are being made to meet the demand for training in these lines. However, these changes, while good in their way, do not meet fully the demands of the industrial world.

There are no accidental successes in industrial and business lines. Chance sometimes puts a man in a responsible position with a large salary, but it takes more than chance to keep him there. The trained man, who understands the principles of the business, will achieve greater success than the man that guesses and bluffs his way along. The man that specializes his training to meet the conditions of his particular line of business is the man that steadily climbs the ladder.

The foundry is not exempt from the need of trained men Two years ago, in order to meet the new educational demands on the foundry business, the California Foundrymen's Association organized the Superintendents' and Foremen's Club, now the Foundrymen's Club of California, for the purpose of assisting industrial education.

Most of the men that have become members of the Club are already past the intensive period of their training, as far as their school life is concerned. Many are already in charge of important industrial enterprises. They have no time for another period of specialized training, but must depend upon study in their spare moments and upon the exchange of ideas with other foundrymen. Such men can gain a great deal of technical knowledge from the discussion of subjects that are vital to them, and it is here that the Club meets their need.

The meetings of the Club during the past two years have had the object of educating the foundryman in the new and fine points of his game. There have been mistakes, there have been dull meetings, but on the other hand there have been some great successes and some wonderfully interesting meetings.

We are looking forward, during the months of 1919, to a series of helpful and entertaining meetings. These future successes will be made possible only by the hearty response and co-operation of each member of the Club. Let us be enthusiastic about the meetings, and, for the sake of the success that is bound to come, let us boost the educational life of the foundry game.

J. F. K., Jr.

Meetings

The regular open meeting of the Club is held on the third Thursday of each month at 8 p.m. in Yosemite Hall, Native Sons building, San Francisco. All foundrymen are invited to these meetings.

The Policy Committee holds its regular monthly meeting on the fourth Thursday evening of each month in the Association Assembly Hall in the Underwood building. All suggestions for consideration must be sent to the manager before that time.

Another Hunting Trip

South City Bill and Steel-maker Arnold took it into their noodles one day not long ago to take a little constitutional in the shape of a quail hunt in the mountains north of the bay. They left home early one morning intending to get to their destination before the sun set. After a few miles of travel, bingo! went two leaves in the flivver's springs and Bill's wild dashes of speed were tamed down to about five per. After a while they found a smith who thought he could make them new leaves next week, but Bill with his persuading line finally got the smith so worked up that the springs were as good as new some time before the sun went down. They had not reached their destination but were determined to do so according to their first intentions. Dark? Well, maybe you had better ask Arnold, for we understand he thought for the first time that one could hear darkness. Rain? Well, you better ask Bill, for it is told that, after one of his fancy flourishes at the wheel, the car began to slip over the bank and down the hill. After Bill had yelled whoa to the darn machine several times, he tried to lighten the atmosphere by several hot and destructive sentences. A nice little walk in the mud for about a thousand miles brought a farmer and his husky team, and the machine was hauled back to the road and Bill's pocket was lighter of the filthy stuff called cash. Was it a narrow escape? Well, we are told that Arnold's shaky spell lasted all the trip, and was even passed on to the shotgun.

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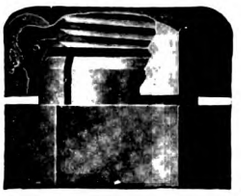
INDUSTRIAL EQUIPMENT

THE DRAKE LOCK-NUT

The Drake lock-nut was devised and patented by George F. Drake of San Francisco. He states that it was his idea to develop a device in a lock-nut that would securely lock on the bolt, at the same time be a simple and correct mechanical job, and one that could be manufactured at a consistent price. The first illustration is a scale drawing of a 1-in. U. S. Standard. The lower, or nut-member, has an ample wrench-hold to turn up the nut and pull the work into place, giving it a micrometer adjustment. After this, the upper or locking-member is turned down, and the contact occurring only on the 25° angle at the top of the boss, which is made flexible by slotting, the lower member is



securely locked on the bolt at the point of adjustment first obtained without lifting the load off the lower member onto the upper member. This is explained by the fact that the two members never contact or seat on a horizontal line at the bottom or top of the boss. The seat or contact occurs on the annular bevel at the top of the boss and the interior annular bevel in the upper member, which is situated at the 'centre of the mass' and point of greatest strength of the upper member. This bevel being 25°, and 20° in larger sizes, has a much greater element of shrink than of lift, thus locking the flexible finger members of the lower member on the bolt without lifting the load already hanging there.

The second illustration shows that the device makes a complete finished job, for the corners of the 'hex' can easily be matched up in locking. The total height of the Drake lock-nut equals a standard nut and check-nut, and they are made in ¼ to 1-in. sizes (Society of Automotive Engineers) and ¼ to 2-in. United States standard.

The Drake lock-nut is manufactured by the Drake Lock-Nut Co., Folsom and Tenth streets, San Francisco.

POWDERED COAL AS A SUBSTITUTE FOR FUEL-OIL

For most of the past two or three years, the consumption of Californian fuel-oil has exceeded production to an alarming extent. Recently, consumption has decreased slightly, partly because a number of former users of fuel-oil have adopted coal, and partly because many of the less-essential industries have been compelled to get along on reduced deliveries of oil. At the same time, the flush output of one new field has increased production. The result has been that, for the time being at least, production and consumption are approximately equal. However, the less-essential industries cannot be expected meekly to take what is given to them after peace is declared. At the same time the demand for Californian lubricants is increasing rapidly, and the refineries are taking an increasingly large amount of the oil formerly burned in a crude state. Users of Californian fuel-oil must expect higher prices in the future and increased difficulty of obtaining supplies, and it behooves them to investigate other possible fuels.

The lignites and semi-bituminous coals of California and other Pacific Coast States are poor fuels when burned in the lump state. Experiments with powdered fuel were made more than thirty years ago, both in the West and in other parts of the country, but the early results were not satisfactory. The processes now in use, however, are economical and efficient. The greatest advance in the use of powdered coal has been made in the cement industry. At the present time nearly 90% of the cement produced in the United States is made with powdered coal. Powdered coal is also being employed in metallurgical work and many other uses, and has even been tried with good results for firing locomotives, and, in one case, for ship propulsion.

The estimated available supply of lignite 'in sight' in California is 35,000,000 tons, divided as follows: Stone Canyon, 6,000,000; Tesla, 10,000,000; Ione, 10,000,000; Dos Rios, 6,000,000; and miscellaneous sources, 3,000,000 tons. It is probable that the total that can be obtained is considerably more than this amount. With the co-operation of officials of the Bureau of Mines, and of J. M. Wadsworth, of the Federal Fuel Administration, R. N. Buell, one of the patentees of the Buell-Santmyer system for using powdered coal, has been making some experiments with Western lignites, employing a disused boiler-plant at 330 Eleventh street, San Francisco. These experiments indicate that, at the present prices of both fuels, powdered coal is at least 10% cheaper than oil on the basis of pounds of water evaporated.

Lignite from Ione, California, is one of the fuels used in these experiments. The following analysis is a fair sample:

	As received	Dry
Moisture	22.44%	0.00
Ash	14.78%	19.08%
Volatile matter	42.37%	54.60%
Fixed carbon	20.41%	26.32%
Sulphur	2.98%	3.85%
B.t.u. per pound	9322	12,016

The fuel is dried in a Ruggles drier. While good results can be obtained with as much as 6% moisture, it is better to reduce the moisture to 3%. A Williams crusher and a Raymond pulverizer are used to bring the coal to such a fineness that 90% will pass a 200-mesh sieve. Fineness of grinding is desirable, since it assists combustion. The pulverized coal is then transported in closed receptacles to the storage-bunker at the furnaces. No trouble has been experienced either here or at Seattle with explosions or spontaneous combustion. It is advisable, however, to see that the temperature of the coal is kept low, and that no conveying or other apparatus be used such that friction might create a spark.

Several good-sized commercial plants using the Buell-Santmyer system are in operation at Seattle, the largest being the Western Avenue plant of the Puget Sound Tramway Co. with a capacity of several thousand horse-power. There is also a 2500-hp. plant at a coal mine near Seattle, which supplies electric energy to several nearby industries. In all about 100 boilers, ranging from 100 to 600 hp., in Seattle are fired by powdered coal. Most of these plants used fuel-oil formerly.

The general lay-out of the experimental plant at San Francisco, which is typical of any plant using this system, is shown in the accompanying sketch. The fuel supply is regulated by a screw-feed. The combination of the coal and air takes place in a specially designed mixing-chamber. If desired, the bunker and mixing-chamber may be placed

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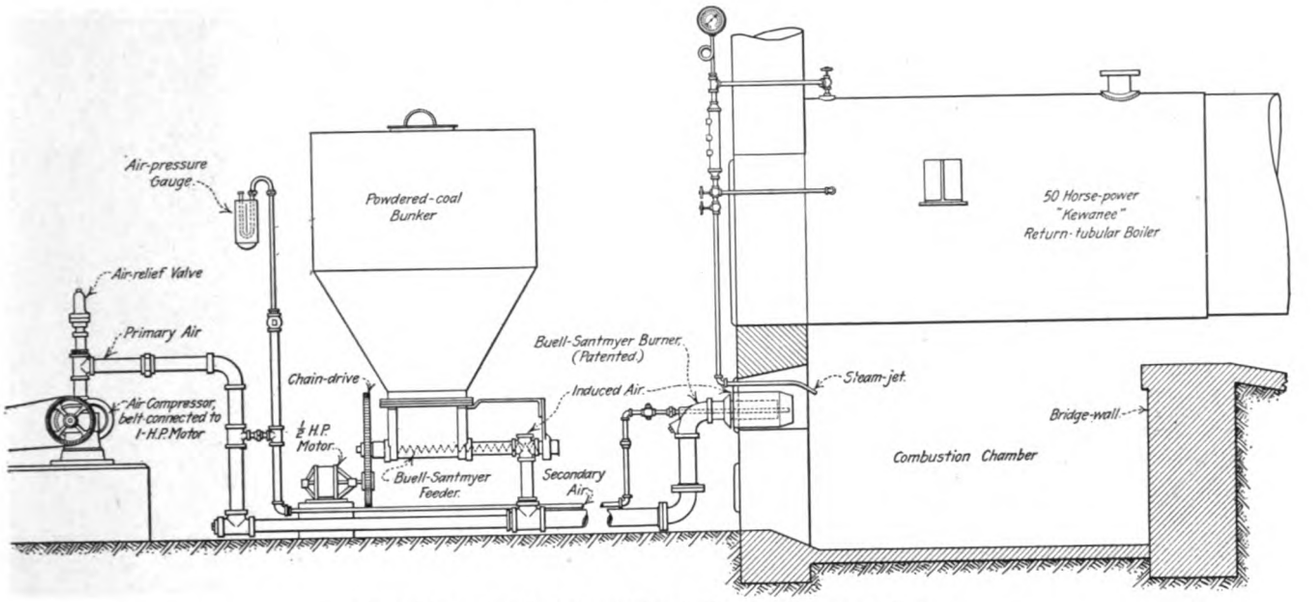

General Layout of Experimental Plant Using Buell-Santmyer System

at a considerable distance from the boiler, and the fuel conveyed by means of a 'booster' service, without danger of separation or of clogging the pipes. In all, about 15% of excess air over that required for complete combustion is used. Where maximum combustion and consequently minimum length of flame is required, about 40% of the air is forced and the remainder induced. These proportions can be altered so as to give almost any length of flame desired.

At the San Francisco plant, using Ione lignite and similar fuels, an evaporation per pound of coal burned of 8.5 to 9.5 lb. of water from and at 212° F. has been obtained. The furnace temperature was 2000° F., the temperature of waste gases, 470° F. The CO_2 reading was 14.4%. The proportion of CO was negligible. Better results than these could probably be obtained with a new plant.

The owner of a small plant will probably find it more economical to purchase his fuel in a pulverized form. Where this is done, the cost of altering an oil-burning plant of two 150-hp. boilers to use pulverized coal will be about $1200, other sizes in proportion. For the larger plants, it would probably be better to construct an entire crushing and drying works. Such an outfit, for a plant using 100 tons per day, would cost, exclusive of building, from $25,000 to $30,000. The cost per ton used would decrease with the capacity of the plant. Thus a plant for preparing 200 tons per day would cost, exclusive of building, $35,000 to $40,000. The cost of processing, from freight car to furnace, will vary from $0.50 to $0.90 per ton. Another way of using the coal is to construct a steam-electric plant at the mine itself and burn the coal there.

A test was conducted at the San Francisco experimental plant on December 5 in the presence of a number of engineers from the San Francisco Bay district. On December 16, at a meeting held at the Engineers' Club under the auspices of the local section of the American Society of Mechanical Engineers, the subject of powdered fuel was discussed by M. C. M. Hatch, of the Locomotive Pulverized Fuel Co., by Mr. Buell, and by several others.

The Pacific Coast Steel Co. has purchased the plant of the West Coast Iron Co. for a price said to be more than $100,000. The plant is equipped with one open-hearth steel-furnace with a capacity of 12,000 tons per year. Under the new ownership the plant will be used entirely for the production of ingots for rolling at the South San Francisco mill of the Pacific Coast company.

NEW BOILER-SHOP OF THE MOORE SHIPBUILDING COMPANY

The Moore Shipbuilding Co. has completed and shipped the first six boilers made at its new shop. These are the first of an order of 30 Scotch Marine boilers being made for the Pacific Coast Shipbuilding Co. at Bay Point. At present, the shop has contracts for 160 boilers of this type, which are made in two sizes—11 ft. long by 14 ft. 9 in. and 15 ft. 2 in. diam, respectively. The working-pressure is 210 lb. In the shell 1⅝-in. steel is used. The upper heads are 1¼-in. plate and the lower heads 1 13/16-in. plate.

There is no better equipped boiler-shop in the United States than the Moore company's. The layout has been arranged particularly for promoting efficient operation. The building is 110 by 320 ft. It has a saw-tooth roof, which gives an abundance of light and ventilation. The shop is divided into two bays, one 50 and the other 60 ft. wide, served by a 10 and a 50-ton crane, respectively. The first bay is devoted principally to flanging and drilling operations and the other to erection, rolling, and planing. At the upper end of the larger bay are placed two Southwark hydraulic riveters for riveting the butt-straps. The larger has a capacity of 150 tons pressure and is 14 ft. in the gap, the smaller gives 100 tons pressure and has a 10-ft. gap. Each riveter is served by a 25-ton crane manufactured by the Cyclops Iron Works. The bending-rolls and the plate-planer are also in the larger bay. The castings for the rolls were furnished by the Southwark Co., but the machine work was done at the Moore plant, and changes were made in the rolls to meet the special conditions of operating. The machine takes plate up to 2¼ in. thick and 12 ft. wide. The 30-ft. Southwark plate-edger was also altered by the Moore company to fit its requirements.

In the centre of the shop are eight radial drills with a 7 ft. 6-in. arm. Four were made by the Baush Machine Tool Co. and four on the ground by the Moore company. In the smaller bay are two 200-ton Southwark hydraulic flanging-presses, which also have been altered by the Moore company. Next to the presses are three oil-fired furnaces designed by the company for heating the flanges. An 800-lb. steam-hammer for making the scarfs is placed in the same group. A special oil-fired annealing-furnace of Moore design is placed next to the flanging-furnace and is used for annealing the heads after forging.

The shop is provided with rolls, shears, riveters, and other tools for the manufacture of tanks, masts, and stacks. Com-

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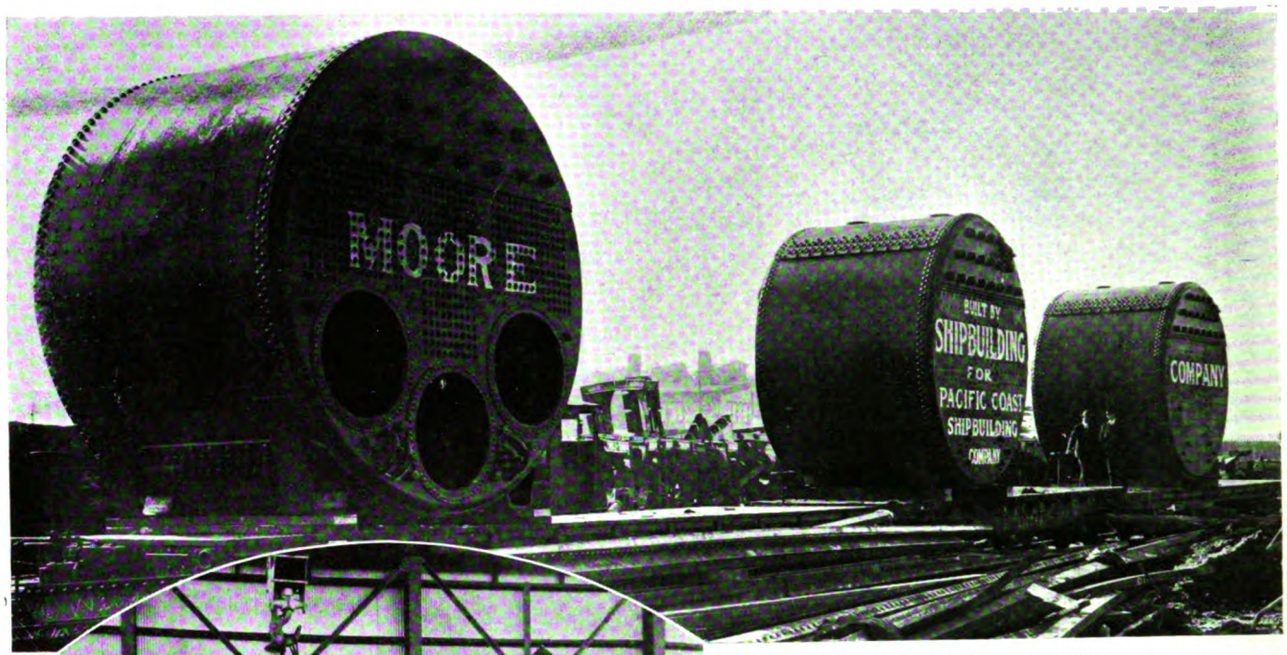

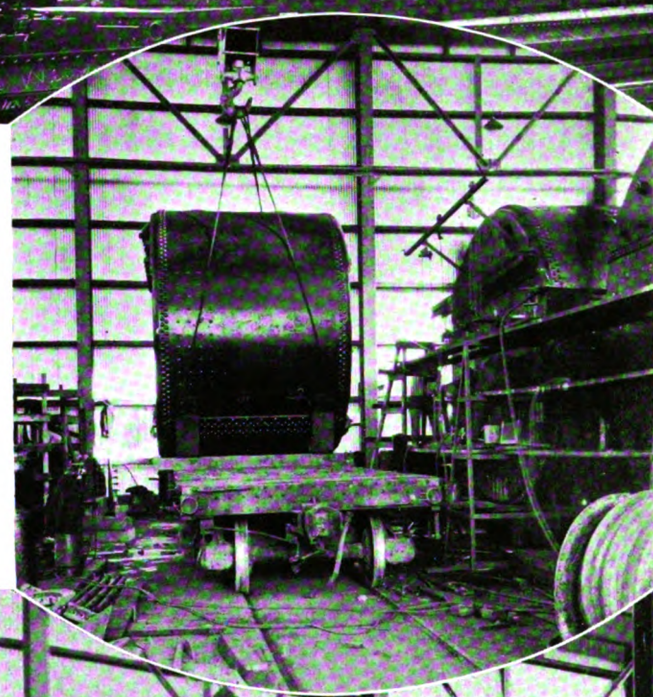

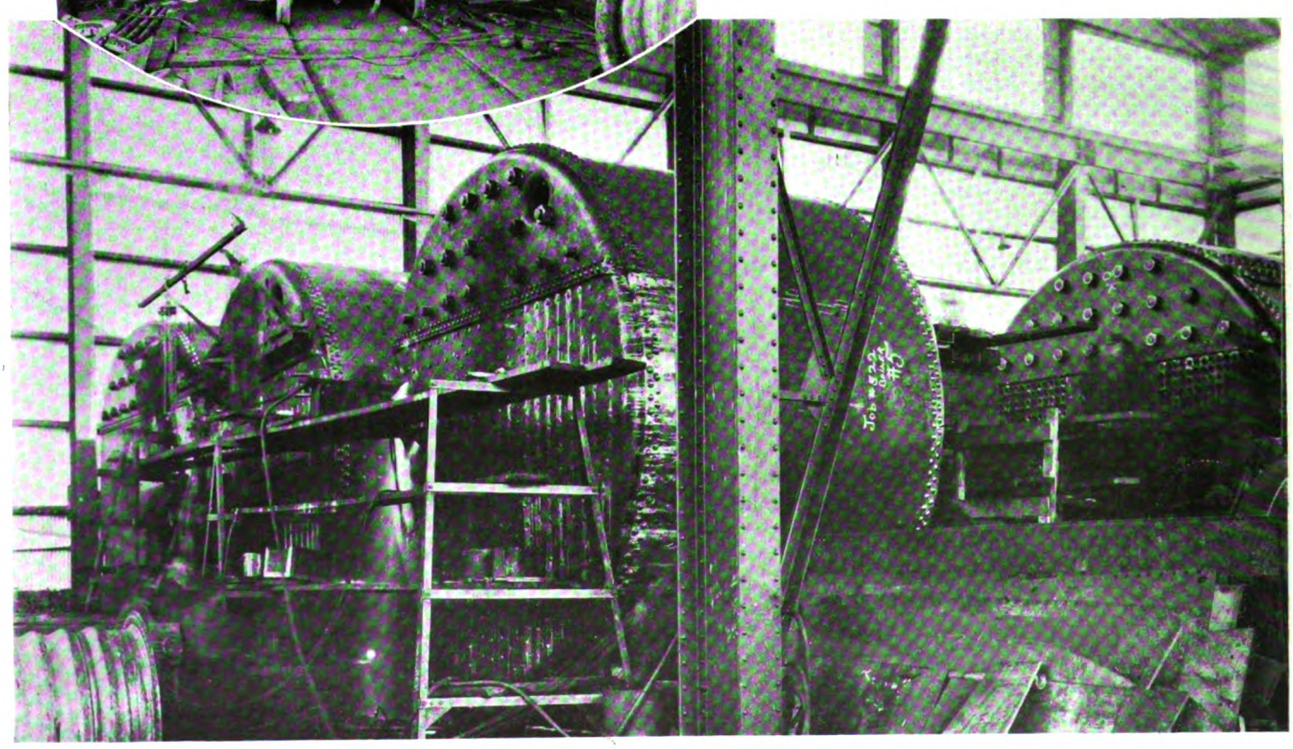

Above: Boilers Ready for Shipment From the Moore Shipbuilding Co. Yard. Middle: Loading First of These Boilers. Below: Part of the Assembling-bay at the Boiler-Shop.

plete equipment is also at hand for cutting, threading, and boring stay-bolts and similar work. The plant has a capacity large enough to take care of the needs of this part of the Pacific Coast for the type of boiler manufactured. Approximately 400 men are employed.

The engineering staff of the company designed and erected the shop, which is now operated under the direction of J. J. King, boiler-shop superintendent.

TRADE NOTES

Harron, Rickard & McCone have issued a

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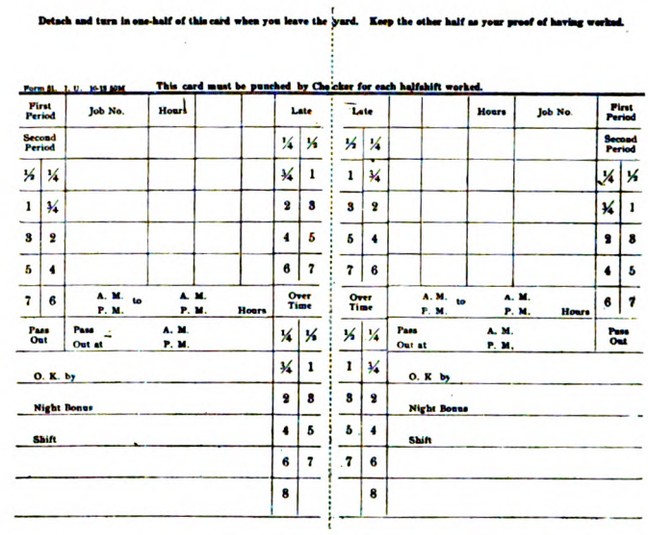
handsomely bound 830-page catalogue of the machinery, small tools, and supplies that they carry. The catalogue is well-illustrated and, besides describing the various articles sold by the firm, contains a number of useful tables of other information.

The Hanlon Drydock & Shipbuilding Co. has developed a tangent-flame circular rivet-heater which is proving much

Tangent-flame Rivet-heater

more satisfactory than the old square type. The furnace is 18 in. outside diameter, 13 in. inside diameter, and 3½ in. high inside. The door is 4 in. square and is placed close to the burner-opening. The burner enters on a tangent and produces a whirling flame, which is more satisfactory than the direct blast of the square furnace. A rivet can be heated in the round furnace in 2 min., whereas it takes 3½ min. to heat the same sized rivet in the square-type furnace.

A new timekeeping system, said to be the only one in use that gives each worker a daily receipt for his labor, thus obviating disputes, has been successfully put in use at the yard of the Pacific Coast Shipbuilding Co. It was devised by three of the company's employees, L. H. Heacock, T. G. Flynn, and L. H. Donnelly. The men are given the receipt-cards on checking-in. The validating is done by time-checkers, who write the number of the job on each man's card. Periods or hours actually worked are indicated by punch-marks in columns provided on the card. The duplicate of



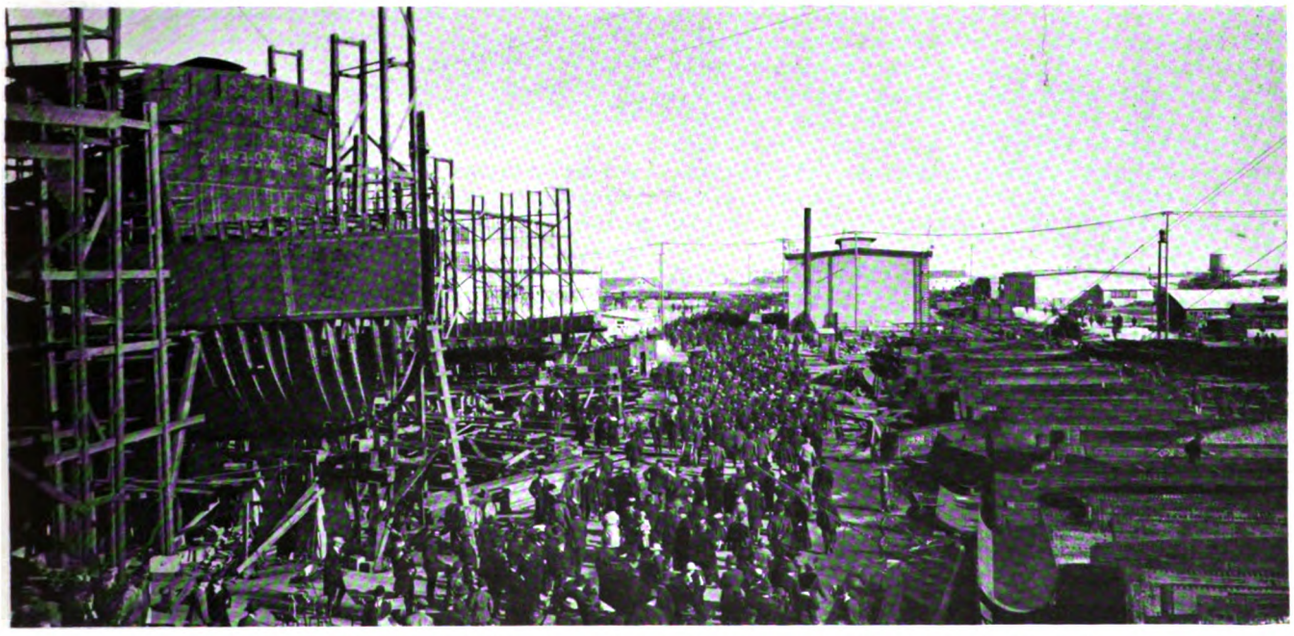
Detach and turn in one-half of this card when you leave the yard. Keep the other half as your proof of having worked.

Form 81. 1. U. 10-18 20M This card must be punched by Checker for each halfshift worked.

First Period	Job No.	Hours			Late		Late			Hours	Job No.	First Period
Second Period					¼	½	½	¼				Second Period
½	¼				¾	1	1	¾				¼ ½
1	¾				2	3	3	2				¾ 1
3	2				4	5	5	4				2 3
5	4				6	7	7	6				4 5
7	6	A. M. P. M. to	A. M. P. M.	Hours	Over Time		Over Time		A. M. P. M. to	A. M. P. M. Hours		6 7
Pass Out		Pass Out at	A. M. P. M.		¼	½	½	¼	Pass Out at	A. M. P. M.		Pass Out
O. K. by					¾	1	1	¾	O. K by			
Night Bonus					2	3	3	2	Night Bonus			
Shift					4	5	5	4	Shift			
					6	7	7	6				
					8			8				

Fig. 1. Time-Card Used by Pacific Coast Shipbuilding Company

each card, with identical markings and punches, gives the office its record. At the end of his shift, the employee turns in half of the double card, keeping the other half for his own record. Those turned in are collected and posted on a card giving the weekly record, which shows the man's full working history for the week, together with any deductions. If there is a difference of opinion at the pay-window, it is necessary only to put the man's card and the office card together; the punch holes will match and establish the correct record. If a man has done the work he claims, his card will show it, and it is unnecessary for him to stand in line at the



Part of the Pacific Coast Shipbuilding Co. Yard at the Launching of the 'Diablo', November 30, 1918

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window, discuss his complaint at length, and perhaps run around the yard to get somebody to O. K. his claim. As will be seen from Fig. 1, the cards used are arranged to economize space. There are columns for the job-number and the hours worked, with punch columns for first and second period (morning and afternoon shift, or the equivalent in night work), and hourly periods, to show the time worked, with quarter, half, and three-quarter divisions. Similar hour-columns enable lateness in reporting to be recorded, also overtime. The pass-out time is indicated, and space is provided for signatures validating ordinary time and night-bonus. All this is arranged so that, when the two cards are folded together, the punch-holes are uniform in each, giving the duplicate record.

The General Electric Co. has sold seven Sprague monorail hoists to the American Steel & Wire Co. for its San Francisco plant. This is a 'repeat' order.

The Harris Manufacturing Co., of Stockton, has enlarged its plant and expects to increase its output of harvesting machinery at least 35% during 1919.

The Byron Jackson Iron Works has been awarded a contract for furnishing pumping machinery for an irrigation system on the 10,000-acre ranch of James D. Phelan near Chico.

The Willamette Iron & Steel Works, of Portland, has been awarded a contract for 31 additional Scotch marine boilers for the Emergency Fleet Corporation. The total cost will be about $750,000.

The new shop of the **Skandia Pacific Oil & Diesel Engine Co.** is in operation. The first of a recent order for eight 500-hp. engines has been shipped and the second is on the test-block. Three other 500-hp. engines are being assembled.

The Alameda Sugar Co. and the Alameda Farms Co., both of San Francisco, have applied to the State Water Commission to divert water from the Sacramento river for irrigation in Sutter county. Three pumping-plants will be constructed. The total estimated cost of the project, including irrigation canals, is $287,000.

The San Diego Shipbuilding & Drydock Co. is constructing a shipyard at San Diego. Adam F. Weckler, of Chicago, is interested. He represents the same group that started the U. S. Steel Shipbuilding Co. at San Diego. The yard of the latter company was taken by the Government and is being devoted to building concrete ships.

The Atlas Imperial Engine Co. is building a number of engines, including several engines for fishing-boats, ranging from 55 to 150 hp., a 3-cylinder 150-hp. engine for a combination fire and tug-boat for the Hanlon Drydock & Shipbuilding Co., and two 12-hp. engines for small tug-boats. The company has just shipped the last of six 200-hp. Diesel engines ordered by the Lyall Shipbuilding Co., of Vancouver, B. C. These engines are to be used in three twin-screw motor ships. Engines are also being shipped to Seattle, Astoria, and even to Vladivostok and ports in China.

The Motor Transport Corps, United States Army, will establish a repair and supply base at San Francisco for the district comprising Washington, Oregon, and northern California. The buildings will be designed according to standard plans prepared for all the motor-transport bases to be established in the country. The repair-shop will be 500 by 500 ft., and will be divided into 36 departments. Standardization of plans has been followed to such an extent that a man who has been working on a lathe at, say, the El Paso base, can be transferred to San Francisco, find his lathe in the same relative position as at the other plant, and proceed to work without further general instructions. The building for the storage of repair parts will be 180 by 900 ft. The total area required for the base, including parking-space, will be 25 to 30 acres. Over 1000 officers and men will be stationed at the base.

Personal

Ferdinand Gottfried, of Meese & Gottfried Co., used to make street cars for the old San Francisco cable lines for John Hammond & Company.

R. S. Moore has returned from a two months trip to New York, Philadelphia, and Washington in the interests of the Moore Shipbuilding Company.

A. S. Gunn, of the Bethlehem Shipbuilding Corporation, is in the East on business connected with the corporation. He will return early in January.

Bruce Lloyd, engineer for the Emergency Fleet Corporation, used to sell mining machinery, and lots of it, too, for John Burns & Co., at Auckland, New Zealand.

Charles M. Gunn, of the firm of Woods, Huddart & Gunn, was time-keeper on the trial trip of the U. S. S. Charleston, the first ship built for the United States Navy on the Pacific Coast.

Albert C. Paulsmeier, chief engineer and vice-president of the Byron Jackson Iron Works, was once a draughtsman with the old Holman car-shops, which built the cars for the Geary Street Municipal line.

Frank B. Longley, at one time foreman machinist at the mining branch of the Union Iron Works, and later engineer for the General Pipe Line Co., is with the Army in France as Lieutenant Colonel of Engineers.

E. J. Schneider, contract manager for the bridge and structural department of the United States Steel Products Co., has been elected president of the San Francisco Section of the American Society of Civil Engineers.

George S. Binckley, consulting engineer of Los Angeles, and at one time assistant to M. P. Boss in charge of a group of mines at Pachuca, Mexico, is assistant port officer at Le Havre, France, as Major of Engineers, United States Army.

John L. Key has resigned from the Pacific Coast Steel Co. to go into the scrap steel and iron business for himself. He has opened an office at 407 Call Bdg. **George W. B. Harris,** formerly at the South San Francisco plant of the Pacific Coast company, has succeeded Mr. Key as scrap-buyer for the company.

Frank M. Leland, mining man, raconteur, and all-around good fellow, used to run a dinky steam-power plant at Tuscarora, Nevada, in the early days of mining. Now he runs a few mines, an automobile, and, until recently, has been 'doing his bit' as efficiency engineer for the Moore Shipbuilding Company.

Frank R. Rutter, American commercial attache to Japan, will arrive in San Francisco on January 2. His visit offers an opportunity for Californian manufacturers to discuss prospects for trade with Japan. Arrangements for interviews can be made with E. G. Babbitt, 307 Custom House. **John A. Fowler,** trade commissioner for the Bureau of Foreign and Domestic Commerce, will also be in San Francisco during January, on his way to the Dutch East Indies and Straits Settlements.

Edward J. Fowler of the Pacific Foundry Co. operated the first steel foundry at the Union Iron Works. The plant consisted of one diminutive Tropenas converter, which turned out a few pounds of steel castings, principally gates, every week. Jack Young was boss molder, and out of this association grew the friendship culminating in the formation of the Pacific Foundry Company. George Gunn, now with the Best Steel Casting Co., succeeded Mr. Fowler, without affecting the growing stock of gates and risers, however. In those days, making steel by the open-hearth process was regarded as an iridescent dream, so far as the Pacific Coast was concerned.

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